

Sasaki Associates, Inc.

ARUBA TOURISM DEVELOPMENT PLAN

JANUARY 1983

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ARUBA TOURISM DEVELOPMENT PLAN

BY: SASAKI ASSOCIATES, INC.
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WATERTOWN, MASSACHUSETTS 02172

FOR: DEPARTMENT OF ECONOMIC
DEVELOPMENT
ARUBA, NETHERLAND ANTILLES

JANUARY 1983
SA NO. 1141

ARUBIANA/CARIBIANA
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Arubiana: 831

Sasaki Associates, Inc.

Planning / Architecture / Landscape Architecture / Urban Design
Civil Engineering / Environmental Services

January 31, 1983

Dr. Humphrey O. van Trikt
Director, Department of Economic Development (DECO)
Havenstraat 2
Oranjestad, Aruba
Netherlands Antilles

Re: FL/Aruba Phase 2 Tourism Development Plan
SA No. 1141

Dear Dr. van Trikt:

Sasaki Associates, Inc. is pleased to submit the final report of the Aruba Tourism Development Plan. This report concludes a six-month study of the main Tourism Corridor of Aruba extending along the west coast of the Island from California Point in the north to Oranjestad in the south. The purpose of the work is to expand and illustrate implementation guidelines for the planning concepts originally presented in Volume Three of the Tourism Development Plan submitted to the Island Government of Aruba in March 1981. While the original plan contained overview development guidelines, this report provides more detailed plans and specific design guidelines for effective decision making in response to future developer requests for land parcels and public infrastructure development programs.

The Aruba Tourism Development Plan reflects the commitment of Aruban citizens and government officials to a policy of carefully planned development of the Island's unique natural resources. Perhaps the most important of these resources is the wide sandy beaches and warm ocean waters of the Tourism Corridor. The foresight displayed by the Island Government of Aruba in the preparation of this plan will help to assure the protection of this vital resource for the enjoyment of future generations of Aruban citizens and tourist visitors alike.

Sasaki Associates, Inc.

January 31, 1983
Dr. Humphrey O. van Trikt
Page Two

During the course of this planning effort, Sasaki Associates was assisted by officials of several government agencies who provided useful background information and critical comments. In particular, we wish to acknowledge the assistance of the Department of Public Works (DOW), the Government Land Agency, the Department of Agriculture, Husbandry and Fishery, the Aruba Tourist Bureau, and the Government Legal Department. Finally, special thanks to you and the staff of DECO for the successful coordination of several government agencies to assure the completion of this plan in a relatively short time period.

Yours truly,



Kenneth E. Bassett
Principal

mgm/1141

Enclosure

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I. SUMMARY

This report advances previous planning recommendations of the Physical Development Plan, prepared in 1981, and provides additional planning and design guidelines for the Tourism Corridor of Aruba, an area extending from Oranjestad to California Point. As a result of the planning recommendations of the 1981 plan, meetings with local officials, and the detailed studies of this report, nine important general objectives for future development of the Tourism Corridor have been identified:

1. Maintain a balance between developed land areas and open space
2. Provide public access to the beach
3. Provide for high quality of development
4. Optimize the use of available land resources
5. Provide for alternative (non-automotive) types of circulation
6. Concentrate development to specific areas
7. Optimize the use of precious water resources
8. Minimize adverse impacts on sensitive environmental areas
9. Provide for island resident recreational facilities.

In order to implement these objectives, the 1981 Physical Development Plan provided a general planning framework for future development. Based on those general recommendations, the purpose of this report is to advance previous planning efforts and provide more detailed recommendations to meet the above development objectives for the Tourism Corridor. Following is a general summary of recommendations.

Existing Conditions. Analysis of existing conditions and review of current development proposals for the Tourism Corridor indicates an abundance of public and private activities in the area which may soon radically alter the character of the existing landscape. While many of these actions will be positive contributions to future tourism and neighborhood development, several proposed actions will have adverse impacts. As a first step, a case-by-case review of pending actions as they relate to the development objectives for the Tourism Corridor should be undertaken immediately to assure coordinated development of the Tourism Corridor.

Corridor-wide Planning Issues. Policies should be adopted and action taken to address three general planning issues of corridorwide importance:

1. Vehicular traffic and pedestrian circulation conflicts will grow significantly in coming years, especially as tourism and residential development inland of the Coastal Boulevard are completed. To reduce this conflict and enhance tourism development, a Dual Arterial roadway network should be implemented. The most important feature of this network is the construction of a new Inland Arterial between Eagle Beach and Malmok to better serve north-south through traffic. Concurrently, L. G. Smith Boulevard should be downgraded to simplify vehicular and pedestrian access between inland development areas and the beach.
2. Environmentally sensitive zones exist within the Tourism Corridor that are threatened by development. These include the unique geological formations and dunes of Arashi/California Point and major Salinas areas throughout the Corridor. Efforts should be taken to preserve areas in their natural state. In the case of the Salinas, their environmental function for floodwater storage is significant and soil stabilization experiments should be initiated.
3. Dense planting and revegetation of desert areas often accompanies resort hotel development, as exemplified in the Eagle and Palm Beach area. On an island such as Aruba where water supplies are scarce and good soils must be stripped and imported from other areas, this sort of lush planting taxes local resources heavily. To reduce these impacts, development throughout the Tourism Corridor should capitalize on the beauty and potentials of the existing desert landscape rather than attempt a radical transformation to a lush, green place. Three planting and revegetation concepts are recommended:
 - a. Extensive use of selected native plants.
 - b. Lush, green dense planting should be used in focused 'oasis' nodes.
 - c. Use agricultural development to achieve aesthetic and food production benefits.

In addition to planning issues of corridor-wide importance, careful planning for each of the subdistricts of the Tourism Corridor should be undertaken. The existing environment and future potential of California Point is different from Eagle Beach or Palm Beach. Following is a summary of planning considerations for each of the subdistricts of the Tourism Corridor.

Arashi and California Point. The wide valley at Arashi and the rugged coast at California Point is the beginning of an extensive area of natural diversity. Portions of the area exist in a fragile environmental equilibrium and efforts should be taken to preserve these areas from development. Development of the area should be undertaken concurrently with implementation of a North Shore National Park. In any case, only low impact developments, compatible with such a National Park, including campgrounds, scenic drive, observation points, trails, beach picnic sites, etc., should be allowed. Until planning for the entire North Shore is begun, no further development permits at Arashi and California Point should be granted.

Malmok. The Malmok area is experiencing beginning pressures for extensive high quality residential development, particularly on the ridgeline separating the area from the Arashi Valley. If future development in the area is large in scale or built too close to the ridgeline, it will encroach visually on the Arashi Valley. It will also be out of character with existing development. Therefore, a 10.7 meter height limit and a ridgeline setback should be established. Development in the area should be limited to residential uses of the type and scale existing. Commercial development in the area should not be allowed.

The Malmok area also contains the major Salinas areas of the Tourism Corridor. These areas should be preserved from development and stabilized.

Palm Beach. This area has been identified as the location of all high rise hotel development in the Tourism Corridor. The height in the area should be limited however, to mitigate impact on the surrounding scale of residential neighborhoods, etc. For these purposes, height limits of 36 meters should be enforced.

To preserve the scale and character of residential neighborhoods near Palm Beach, a height restriction of 10.7 meters should be established for these areas. Salinas areas should be preserved in their natural state and stabilization experiments using salt tolerant grasses begun.

Treatment Plant Lagoon Area. The existing sewage treatment plant lagoon is a water resource with great potential. It is currently home for a large number of colonial nesting waterbirds native to the region. With its central location in the Tourism Corridor, fresh water, and abundant wildlife, this area should be developed as a wildlife park and botanical garden.

In future years, a large portion of the lagoon water will be used for agricultural development projects in nearby areas. A careful budgeting of the lagoon water resources will be required in future years to provide a balanced water allocation for development of the wildlife park, botanical garden, agricultural, and other uses.

Eagle Beach. The existing small scale character of Eagle Beach should be preserved and promoted as a tourism alternative to the high rise hotels of Palm Beach. For these purposes, a maximum height limit of 15.2 meters should be enforced. In addition, density guidelines of 57 units per net hectare should be followed.

In the future, most new development at Eagle Beach will occur inland of L. G. Smith Boulevard. To provide access to hotels, beach access, and amenities in the inland area, development should be organized around 40 meter wide Inland Connectors. These should provide small hotel access roads, pedestrian paths and 'oasis' nodes of high quality plantings.

Retail commercial facilities ("Eagle Beach Village") should be concentrated in the area directly north of the Horacio Oduber hospital rather than as a strip along Eagle Beach. Commercial facilities should be of a tourist convenience type, and limited in area so as not to compete with the economic viability of the Oranjestad CBD. Future expansion of hospital-related office and commercial uses should be located west of the hospital and accessed from the new inland arterial.

Tourism Gateway. The entrance to the Tourism Corridor adjacent to the Hotel School is an important gateway to the special world of Aruba's beaches, sun, nightlife, etc. The area should receive special treatment such as ornamental plantings, fountains, special lighting and signage to improve the first impression of the Tourism Corridor.

Outside the Tourism Corridor. Planning and development guidelines should be established for two important areas:

1. The rugged North Shore of the island already functions as an important tourism destination. More important however, the potential exists for this area to play an increasing role in the recreational activities of tourists and local citizens alike. Like California Point, however, development of the area must be carefully controlled to assure the protection of the unique natural and cultural features of the area. Initial planning studies should begin to identify and implement a National Park program along the North Shore of the island beginning at California Point.
2. The Oranjestad Waterfront is, effectively, the true gateway to the Tourism Corridor. For visitors to Aruba it is the place where the first, and possibly most important, impressions of Aruba are formed. At present, most of the area is dominated by parking lots and vehicular traffic along L. G. Smith Boulevard. The potential exists to create a lively waterfront environment in the harbor area by the careful development of public promenades, commercial activities, and expanded marina and cruise ship facilities for the benefit of tourists and local residents alike. To achieve this goal, a comprehensive waterfront development plan should be developed for the harbor area.

II. INTRODUCTION

II. INTRODUCTION

A. Summary of Background Planning Issues

In March 1981, Sasaki Associates of Watertown, Mass., in association with International Development Advisory Services of Miami, Florida, submitted the comprehensive Aruba Tourism Development Plan to the Island Government of Aruba, Netherlands Antilles. The three volume report contained comprehensive analysis and diagnosis of Aruba's tourism industry and developed projections and program recommendations for the continued development of tourism and related resources. As part of these recommendations, a "Physical Development Plan" (Volume 3) was proposed, which set forth land use and environmental recommendations for the physical development of island-wide tourism resources.

The objective of the Physical Development Plan was to define those physical planning actions which the Aruban Government should pursue in the interest of sound tourism growth. Recognizing that a major prerequisite for tourism is an attractive environment, the Physical Development Plan concluded:

It is essential that future development on the island be responsive to carefully conceived plans, regardless of whether the growth is tourist-related or resident related. Aruba's natural environment is both beautiful and vulnerable, and poorly conceived or uncontrolled development could inflict permanent damage which would lessen the island's appeal. Conversely, the quality of most tourism facilities development to date suggests that the future can, indeed, be one which features appealing contrasts between the man-made environment and the natural landscape.

As part of the island-wide recommendations, the Physical Development Plan identified and presented specific recommendations for the future development of the "Tourism Corridor", a coastal area extending approximately 11 kilometers from the City of Oranjestad to California Point in the northwestern corner of the island. The Tourism Corridor has become the focus of Aruba's tourism growth primarily because of the wide beaches, warm ocean waters and easily developable land which exist in that area. Furthermore, major investments by the Aruban Government in roadways, waterlines, and sewage treatment facilities in the corridor have already facilitated large scale resort hotel development, thereby creating a significant incentive for continuing tourism growth.

The Physical Development Plan for the Tourism Corridor outlined the following specific actions for future development in the area.

- Since much of the available beachfront had already been developed, the plan proposed the realignment of key portions of the existing coastal boulevard along with the development of several new arterial and connector roadways to create 19 new parcels for tourism-related development.
- An interconnected network of inland open space corridors would provide pedestrian connections to the beach and amenities for developments on the inland side of the coastal boulevard.
- Building height and density guidelines were proposed for the Palm Beach and Eagle Beach areas, conforming closely to the existing scale of development in each area.
- Phasing recommendations were made to accommodate the projected 20 year demand for new tourism facilities within the height and density guidelines.
- Infrastructure and construction demand requirements were analyzed to assure that proposed development of the Tourism Corridor would be conducted within the labor and capital improvement capabilities of the Aruban Government.

The 1981 Physical Development Plan was limited in detail in many areas. The plan identified the critical or priority concerns in terms of physical planning and design, ranging from island-wide considerations to project specific considerations. Most of the recommendations were general in nature, with little elaboration regarding actual physical design characteristics or detail planning considerations.

As part of the three volume Aruba Tourism Development Plan, the Physical Development Plan served to begin a dialog among government officials, tourism planners and private developers concerning the long-term physical development of the Tourism Corridor.

Subsequently, in June, 1982 Sasaki Associates was requested to visit the Island of Aruba, meet with local officials, and provide further recommendations on the implementation of the Tourism Development Plan. This report is the result of that study. Following the general development guidelines of the 1981 Plan, this study:

- Reviews existing conditions and recent developments within the Tourism Corridor as they relate to the recommendations of the 1981 Physical Development Plan.
- Revises and updates the recommendations of the Phase I study in light of recent public and private actions. At the request of Aruban officials, the areas of California Point, Arashi and Malmok have been included in recommendations for the Tourism Corridor.
- Provides additional planning and design guidelines for all areas of the Tourism Corridor.

B. Analysis of Existing Conditions in the Tourism Corridor

Government Actions

Since completion of the Aruba Tourism Development Plan in March 1981, various agencies of the Aruban Government have vigorously pursued several of the recommended actions. Among these actions, it is noteworthy that the recommended establishment of a new Aruba Tourist Authority (ATA) with offices in Maimi, Florida was implemented in February, 1982.

Furthermore, within the Tourism Corridor, the implementation of important physical planning and design recommendations has begun. The following section provides an overview of recent government activities in the Tourism Corridor (see Figures 1, 2, & 3):

- . Survey and design for relocation of L.G. Smith Boulevard at Eagle Beach to create new development parcel number 6 and improve circulation turning movements in the area. A 450 unit hotel has been proposed for new parcel number 6.
- . The Department of Economic Development (DECO), in cooperation with the Government Land Agency, has initiated a review process of new projects to assure conformance with the physical guidelines of the plan; notably, the preservation of open connectors to beachfront areas and the implementation of height and density guidelines for the Palm Beach and Eagle Beach areas.

In addition, certain other actions have been proposed by the Department of Works (DOW) and other public agencies to improve access to the Tourism Corridor and stimulate tourism development including:

- . Realignment of L.G. Smith Boulevard at Palm Beach between the Sheraton Hotel and Hadicurari to create several new beachfront parcels at Palm Beach and provide improved access to inland development parcels and residential neighborhoods in the Noord area.
- . Circumferential to San Nicolaas: proposed extension of arterial bypass around Oranjestad connecting Eagle Beach to San Nicholas.
- . Circumferential to Airport: proposed extension of arterial bypass around Oranjestad connecting Punta Brabu to Princess Beatrix International Airport.
- . Roadway improvements in the Kojari area connecting the Bubali Road to the Palm Beach/Noord Road.

- Extension of Free Trade Industrial Zone: Proposed establishment of additional Free Trade Zone facilities within the previously defined tourism zone at the A-2 parcel of the 1981 Plan.
- Hospital Expansion: Proposed future expansion of Dr. Horacio Oduber hospital into parcel B-1 (1981 Plan) at Eagle Beach.
- Recently proposed and developed residential subdivisions at Posabao, Bacoval and Malmok.

Private Actions

In addition to the above-mentioned government development actions, continued private developer interest and activity in the Tourism Corridor is apparent, indicating substantial pressure for private tourism-related development.

Several such tourism - related developments are currently under review by agencies of the Island Government. It is not the intent of this study to provide detailed analysis of current development proposals. Rather, the purpose of this report is to establish a long range plan for use by the island government in a case-by-case review of future development proposals. However, while some private development proposals are desirable and within the goals established by the 1981 Physical Development Plan, other proposals are clearly inconsistent with the intent of original planning efforts and should be either modified or rejected.

Analysis of Existing Conditions

Figures 1, 2, and 3 illustrate a summary analysis of existing conditions and development proposals, both public and private, from California Point in the north to Oranjestad in the south. The 1981 Physical Development Plan described the existing visual character of the area as follows:

"The relatively small amount of development in the tourism corridor has led to a striking balance between the natural character of the coast and inland areas and the highly developed areas of Eagle and Palm Beach. The present contrast between developed and undeveloped areas in the tourism corridor has been heightened by the fact that development to date has been relatively large in scale and has received significant emphasis on controlling the quality of architecture and site development."

It is clear that the present contrasting character of natural and developed areas will be changed dramatically as the large number of public and private development proposals are implemented. It is therefore imperative that the Island Government continue to plan carefully for the future development of the Tourism Corridor - in advance of the increasing wave of

development which can be expected in the future. To date, the Aruba government has been careful to plan for new development. However, as Figures 1, 2, and 3 indicate, there is significant pressure for development which will radically change the character of the Tourism Corridor. This will place increasing pressure on government planners to approve developments which may not be in the best interest for the future development of the Tourism Corridor. It is therefore more important than ever before that plans for the ordered growth of tourism facilities be adopted and followed.

The 1981 Physical Development Plan was the first step in efforts to plan for the future physical development of the tourism area. Many of the recent projects previously outlined respond to the objectives and guidelines of that plan. The following sections advance the recommendations of the 1981 Plan and define in greater detail how the objectives of that plan may be accomplished.

CALIFORNIA POINT

SECLUDED BEACHES AND ROCKY INLETS

ROUGH COASTLINE OF NORTH POINT IS
MOST DRAMATIC OF ENTIRE TOURISM
CORRIDOR.

CALIFORNIA DUNES

NATURAL WIND-BLOWN SAND DUNES
A INTERESTING FORMATION.

UNCONTROLLED VEHICULAR MOVEMENT

NEGATIVE IMPACT ON NATIVE VEGETATION,
GEOLOGIC FORMATIONS AND VISUAL QUALITY.

CALIFORNIA LIGHTHOUSE

DRAMATIC FOCUS OF ENTIRE CALIFORNIA/ARASHI AREA.
EXCELLENT VIEWS OF ENTIRE NORTH POINT AREA.

PUBLIC BEACHES

ARASHI VALLEY

UNDEVELOPED. DRAMATIC LANDSCAPE OF ROCK OUTCROPS, RED EARTH,
NATIVE VEGETATION AND LIGHTHOUSE. UNCONTROLLED VEHICULAR MOVEMENT,
TRASH DUMPING AND BEGINNING DEVELOPMENT HAVE A NEGATIVE IMPACT
ON THE NATURAL BEAUTY OF THE VALLEY. EXCELLENT POTENTIAL FOR A
NATURAL AREA TRANSITION FROM MALMOK TO ARASHI.

RIDGELINE

SEPARATES UNDEVELOPED ARASHI VALLEY FROM RESIDENTIAL
DEVELOPMENT OF MALMOK. IMPORTANT VISUAL BARRIER.
SEPARATING ROUGHED NORTH COAST FROM DEVELOPED
AREAS SOUTH OF RIDGE.

NEW RESIDENTIAL SUBDIVISION (PARTIALLY DEVELOPED)

LOWER ELEVATIONS ALONG NEW VAN MALMOK CURRENTLY
BEING DEVELOPED. DEVELOPMENT OF UPPER ELEVATIONS
WILL BE VISIBLE IN ARASHI VALLEY UNLESS RESTRICTED.

HILLTOP AND RIDGE WITH NATIVE VEGETATION VISUAL HIGHLIGHT WITH DENSE NATIVE VEGETATION.

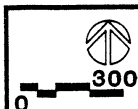
RESIDENTIAL VILLAS

HIGH QUALITY RESIDENTIAL DEVELOPMENT; LOW SCALE,
TILE ROOF AND STUCCO TYPICAL. COMMERCIAL AND
HOTEL DEVELOPMENT NOT APPROPRIATE IN THIS NEIGHBORHOOD.

SALINAS

ENVIRONMENTALLY SENSITIVE ZONES IMPORTANT FOR
GROUNDWATER RETENTION AND VISUAL OPEN SPACE.

MATCH LINE



ANALYSIS OF
EXISTING
CONDITIONS

ARUBA TOURISM DEVELOPMENT PLAN

SASAKI ASSOCIATES, INC.

PLANNING, ARCHITECTURE, LANDSCAPE ARCHITECTURE, URBAN DESIGN, CIVIL ENGINEERING, ENVIRONMENTAL SERVICES
64 PLEASANT ST. WATERTOWN, MASSACHUSETTS 02172

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MATCH LINE

NEW RESIDENTIAL SUBDIVISION (PARTIALLY DEVELOPED)

IMPORTANT EXISTING NATIVE VEGETATION

EXTENSIVE STANDS OF AGAVE, SEA GRASS AND PALM.
POTENTIAL LANDSCAPE USE WITH MINIMAL WATER REQUIREMENT.

RELOCATION OF L. G. SMITH BOULEVARD (PROPOSED)

NEW BEACHFRONT DEVELOPMENT PARCELS CREATED.
ROADWAY NOW DEFINES EASTERN LIMIT OF
PALM BEACH DEVELOPMENT.

PALM BEACH

HIGH RISE HOTEL DISTRICT. PUBLIC ACCESS TO BEACH IS LIMITED.
LARGE SCALE HOTELS DOMINATE THE SURROUNDING URBAN LANDSCAPE.
HEIGHT GUIDELINES SHOULD BE ENFORCED. PUBLIC ACCESS
TO BEACH SHOULD BE IMPROVED.

OLDE MOLEN WINDMILL

IMPORTANT HISTORICAL FEATURE OF TOURISM CORRIDOR.
PRESERVE VIEWS TO WINDMILL FROM COASTAL
BOULEVARD AND OTHER AREAS. IMPROVE LANDSCAPE
SETTING OF MILL.

SEWAGE EFFLUENT LAGOON

ABUNDANT WILDLIFE, PARTICULARLY BIRDS.
HIGH POTENTIAL FOR WILDLIFE DEVELOPMENT, PUBLIC PARK,
ETC. LARGE PORTION OF LAGOON WATER ALLOCATED
FOR FUTURE AGRICULTURAL DEVELOPMENT PROJECTS.

RECENTLY IMPROVED LOCAL STREET

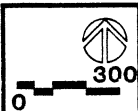
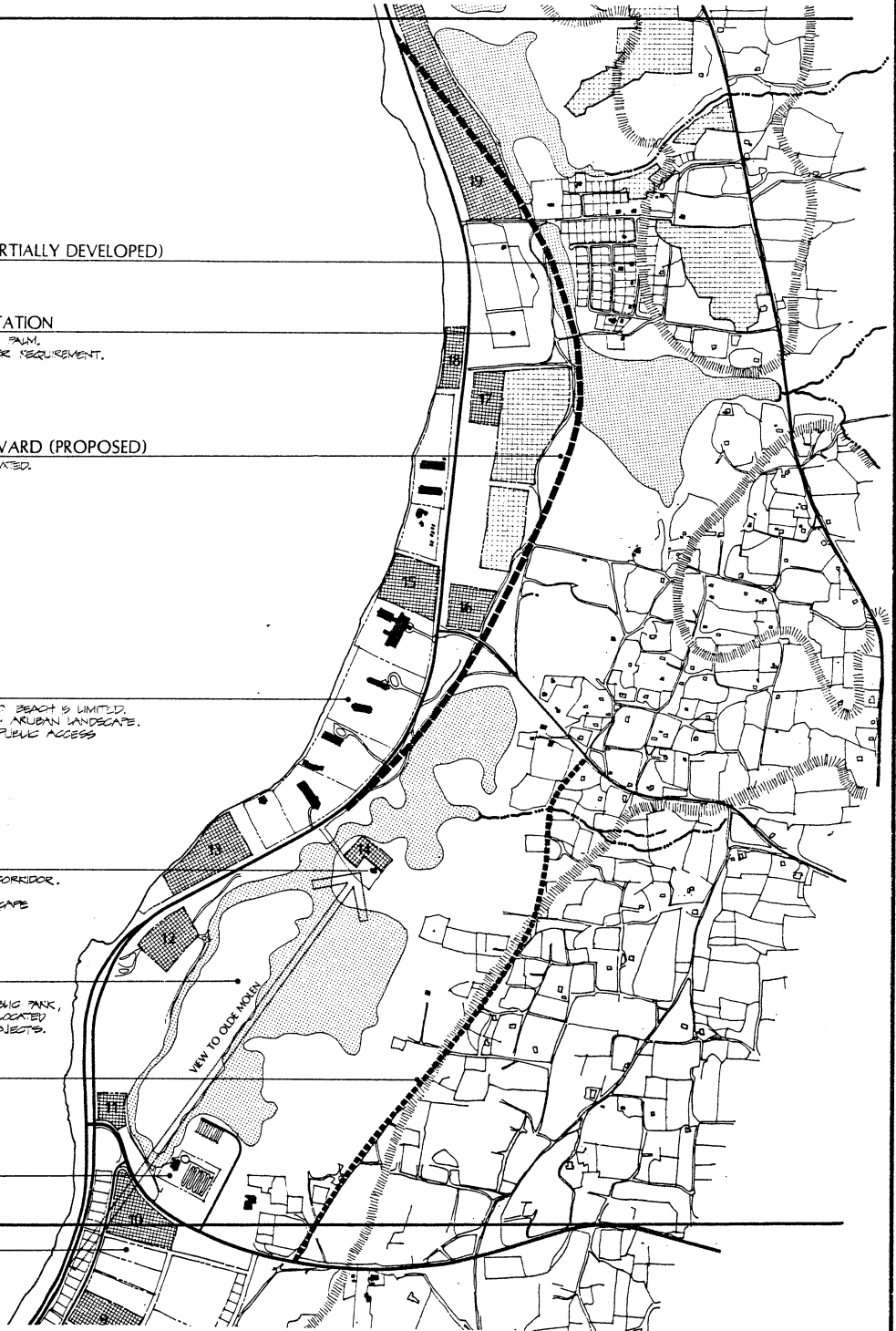
HIGH QUALITY RESIDENTIAL DEVELOPMENT.
MAJOR TRAFFIC IMPACTS ON RESIDENTIAL
NEIGHBORHOOD SHOULD BE AVOIDED.

SEWAGE TREATMENT PLANT

MATCH LINE

COMMERCIAL SUBDIVISION
(UNDEVELOPED)

CONTINUOUS FRONTAGE DEVELOPMENT OF
SMALL PARCELS WILL REDUCE VALUE
OF LARGER PARCELS.



ANALYSIS OF
EXISTING
CONDITIONS

ARUBA TOURISM DEVELOPMENT PLAN

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SEWAGE EFFLUENT LAGOON

ABUNDANT WILDLIFE, PARTICULARLY BIRDS.
HIGH POTENTIAL FOR WILDLIFE DEVELOPMENT, PUBLIC PARK,
ETC. LARGE PORTION OF LAGOON WATER ALLOCATED
FOR FUTURE AGRICULTURAL DEVELOPMENT PROJECTS.

RECENTLY IMPROVED LOCAL STREET

HIGH QUALITY RESIDENTIAL DEVELOPMENT.
MAJOR TRAFFIC IMPACTS ON RESIDENTIAL
SUBDIVISION SHOULD BE AVOIDED.

SEWAGE TREATMENT PLANT

MATCH LINE

**COMMERCIAL SUBDIVISION
(UNDEVELOPED)**

CONTINUOUS FRONTAGE DEVELOPMENT OF
SMALL PARCELS WILL REDUCE VALUE
OF LAND PARCELS.

**CIRCUMFERENTIAL TO
SAN NICOLAAS (FUTURE)**

**REALIGNMENT OF
COASTAL BOULEVARD**

NEW BEACHFRONT
PARCELS CREATED.

**NEW RESIDENTIAL SUBDIVISION
(UNDEVELOPED)**

LOCATED ON SOILS WITH POTENTIAL FOR AGRICULTURE.

**FUTURE HOSPITAL
EXPANSION**

DRUIF BEACH

FIRST VIEWS OF BEACH AND SEA FROM
TOWNHOMES CORRIDOR. RESTRICT DEVELOPMENT.
PRESERVE OPEN BEACH ACCESS.
FREE TRADE ZONE (FUTURE)

COMMERCIAL/INDUSTRIAL TRAFFIC FROM NEW
CONTAINER PORT WILL CONFLICT WITH
TOURIST TRAFFIC ON COASTAL BOULEVARD.

**COMMERCIAL SUBDIVISION
(UNDEVELOPED)**

BEACH SAND NOURISHMENT STOCKPILE

VIEWS OF OCEAN FROM COASTAL BOULEVARD BLOCKED.

HOTEL SCHOOL

CONTAINER PORT FACILITY (UNDER CONSTRUCTION)

FUTURE VEHICULAR CONFLICTS WITH
TOURIST TRAFFIC ALONG COASTAL BOULEVARD.

LEGEND



SALINAS



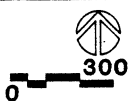
PRIVATELY OWNED LAND
(PROPERTY LAND)



PRIVATE DEVELOPMENT PROJECTS
UNDER LEASE APPLICATION



SOILS WITH POTENTIAL FOR
AGRICULTURE



ANALYSIS OF
EXISTING
CONDITIONS

ARUBA TOURISM DEVELOPMENT PLAN

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C. Summary of Current Planning Issues

The 1981 Physical Development Plan identified five important objectives to be addressed in the future development of the Tourism Corridor. These objectives include the following:

- Maintain a balance between intensively developed land areas and general open space areas.
- Provide for public access to beach and water areas while recognizing the need to maintain private areas related to resort facilities.
- Provide for a high quality of development.
- Optimize the use of available land resources for near-term and long-term tourism growth.
- Provide alternative (non-automotive) types of circulation within the tourism corridor.

In addition to these five objectives, certain other objectives have been identified as part of the Phase II Tourism Development Plan:

- Plan for concentrated areas of development in the Tourism Corridor to avoid the appearance of strip development and its potential visual blight.
- Optimize the use of high quality sweet water for irrigation and aesthetic purposes and plan for the use of rainwater and recycled water wherever possible.
- Minimize the adverse impact of development on sensitive environmental areas, particularly areas necessary for stormwater retention, areas with important stands of native vegetation, and areas of outstanding visual quality.
- Provide for island resident recreation facilities in the Tourism Corridor.

To meet these general objectives, important issues affecting the overall development of the Tourism Corridor must be addressed. The following section summarizes important corridor-wide planning issues.

1. Traffic and Circulation

Currently, the destination of most existing traffic entering the Tourism Corridor along L.G. Smith Boulevard is the high rise hotel district of Palm Beach. This area has the highest room density of any area in the corridor with approximately 1500 rooms in 1982. If development along the Tourism Corridor proceeds according to estimates of the 1981 Physical Development Plan, 1800 additional rooms may be expected in the Palm Beach area from expansions of existing hotels and utilization of existing beachfront sites, bringing the total room population to 3300 rooms. This figure does not include expansions into inland sites identified in the 1981 Plan.

As demand continues and 47 hectares of newly created beachfront parcels (from coastal boulevard relocation) are developed at recommended densities of 125 hotel rooms per net hectare, 4700 additional hotel rooms could be developed in the future. (This figure includes development of 9.5 hectares of private property lands inland of Palm Beach). Thus, a total of 8000 rooms/units could be accommodated at Palm Beach, making the area a primary destination for vehicular traffic originating from Oranjestad, the airport, and San Nicolaas.

Increased development and added density in the Palm Beach Area will mean increased traffic congestion along the entire length of L.G. Smith Boulevard within the Tourism Corridor. This will have the negative affect of reducing the aesthetic value of the boulevard as the primary tourist travel route. In addition, as development proceeds on the inland side of the boulevard, increased traffic congestion will mean an increase in pedestrian/vehicle conflicts along the boulevard, particularly in the Eagle Beach area, as more and more beach-goers seek to cross the roadway. These problems will be exacerbated by the added traffic density which the planned circumferential roads to San Nicolaas and the airport will place on L.G. Smith Boulevard. Furthermore, development of an expanded Free Trade Zone between Oranjestad and the Eagle Beach area will create added traffic conflicts between tourist vehicles and commercial traffic vehicles.

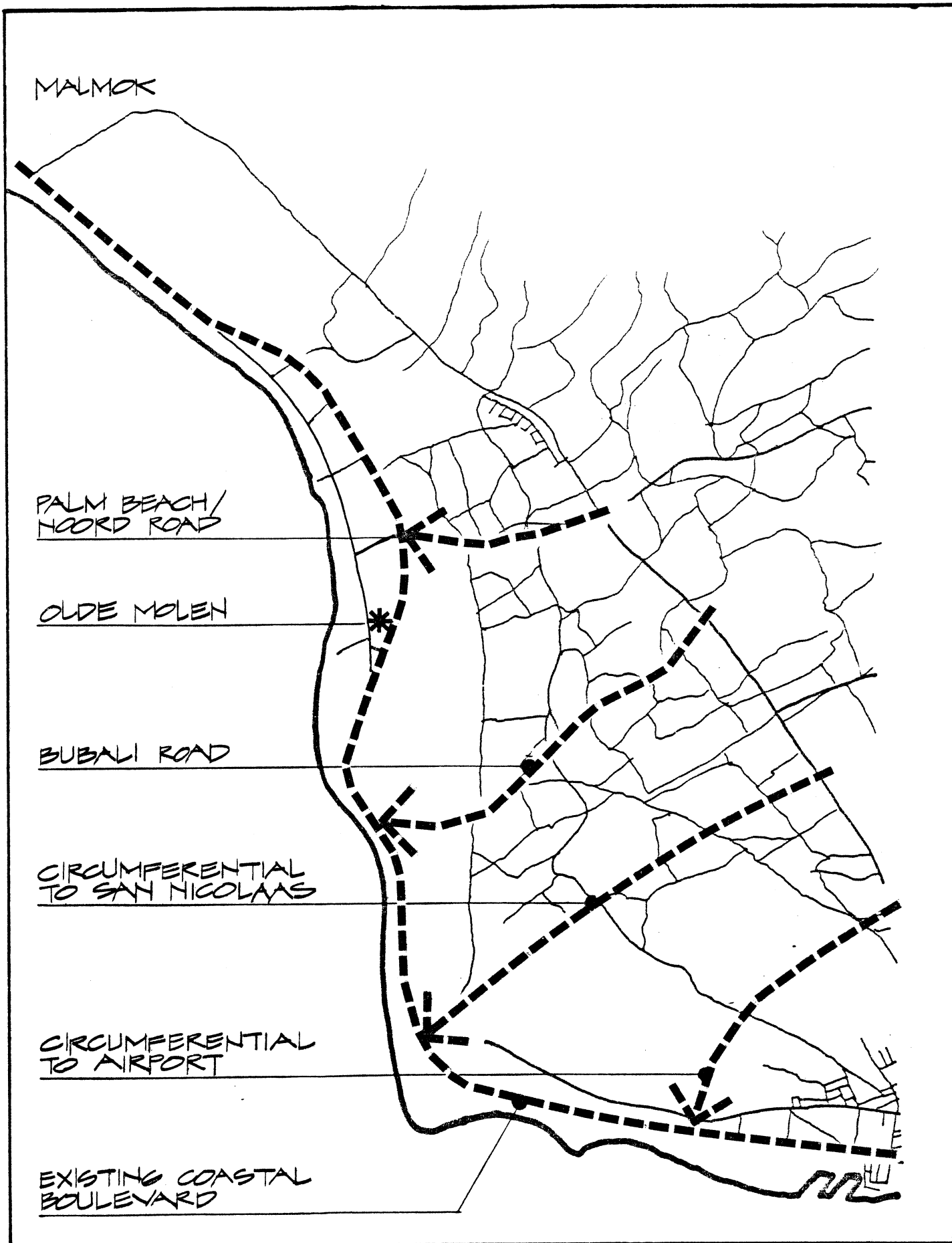
To accommodate future traffic demand and mitigate adverse impacts on tourist facilities, it is essential that the island government adopt a long-range plan for restructuring of the primary roadway system in the Tourism Corridor. Based upon an overall analysis of land use and circulation patterns, three alternative scenarios have been developed and analyzed: Coastal arterial, inland arterial, and dual arteries.

Roadway Alternate A: Coastal Arterial (See Figure 4)

This alternative is, essentially, the existing condition described above. Under this alternative most of the future traffic between Oranjestad and the Tourism Corridor would use the coastal boulevard. As the circumferential roads to the airport and San Nicolaas are completed, they would intersect the coastal boulevard in the Eagle Beach area.

Under this alternative, as development increases on the inland side of L.G. Smith Boulevard and at Palm Beach, measures must be adopted to assure the safety of pedestrians seeking to cross the road to the beach. In addition, intersection design must be carefully considered to provide for added traffic density to new hotel sites. This alternative would incorporate planned road relocations at Eagle Beach and Palm Beach to create new beachfront development parcels and improve circulation turning movements in both areas.

Although certain measures may be taken to mitigate adverse traffic impacts, it is clear that rising traffic densities along a coastal arterial will have a negative impact upon the quality of the Tourism Corridor. Conversely, increased pedestrian crossing zones, intersections, and turning conflicts will restrict traffic flows to Eagle Beach and beyond, reducing levels of service for through traffic. This will have particular impact on service and emergency vehicles seeking rapid access to northern destinations.



ROADWAY ALTERNATE A : COASTAL ARTERIAL

FIGURE 4

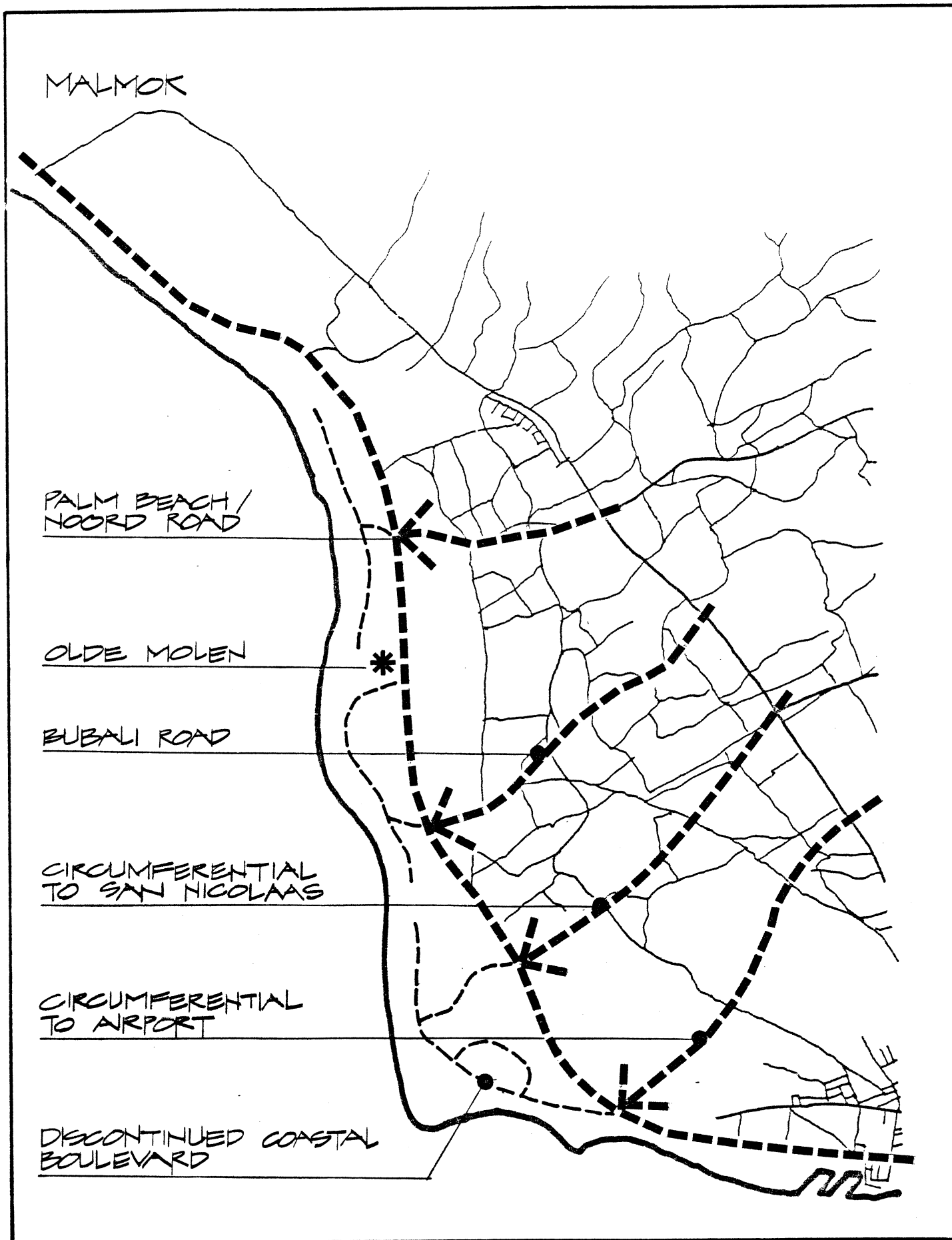
Roadway Alternate B: Inland Arterial (See Figure 5)

Under this alternative the existing coastal road would be discontinued and a single new Inland Arterial roadway would be created to serve the area from Eagle Beach to Malmok. Current proposals to relocate L.G. Smith Boulevard at Palm Beach and Eagle Beach could also be incorporated into this alternative, but the roadway at Eagle Beach would no longer function as a through connection to Palm Beach. Discontinuous sections of L.G. Smith Boulevard would provide localized access to hotels and other tourist facilities along the beachfront corridor. All vehicles with destinations at Palm Beach and beyond would be accommodated along the Inland Arterial, thereby eliminating their impact on the high quality tourist facilities of Eagle Beach. Direct pedestrian access to the beach from inland development parcels would thus be possible along the entire Tourism Corridor. Additionally, the Inland Arterial would provide needed access for the development of inland areas for tourism and local residential uses.

There are disadvantages to this inland alternative, however. When originally constructed, L.G. Smith Boulevard was designed to provide a pleasant coastal boulevard experience for automobile traffic as well as pedestrian traffic. To that end, it was designed well. It provides a pleasing sequence of dramatic vistas alternating between Arubas beautiful beaches and unique inland desert features. The existing coastal road is thus an important element of the Tourism Corridor, not unlike the beautiful waterfront boulevards and corniches of many coastal cities of the world.

The inland alternative would remove this quality from the Tourism Corridor, placing all tourist traffic on a less interesting interior road with service and utility vehicles, etc. In addition, the major investment of the Island Government in developing the coastal road would be wasted. Although previous investments should not be the primary criteria for future development decisions, the value of the coastal boulevard for the tourist experience is an investment worth protecting.

Construction phasing of the Inland Arterial would also be difficult to accommodate, requiring major early investment in roadway construction to allow development of the Tourism Corridor to proceed in accordance with future plans. The large funds required would undoubtedly be difficult to finance. A phased roadway system designed to utilize the existing coastal boulevard is thus preferable to a single inland arterial roadway.



ROADWAY ALTERNATE **B** : INLAND ARTERIAL

FIGURE 5

Roadway Alternate C: Dual Arteries (See Figure 6)

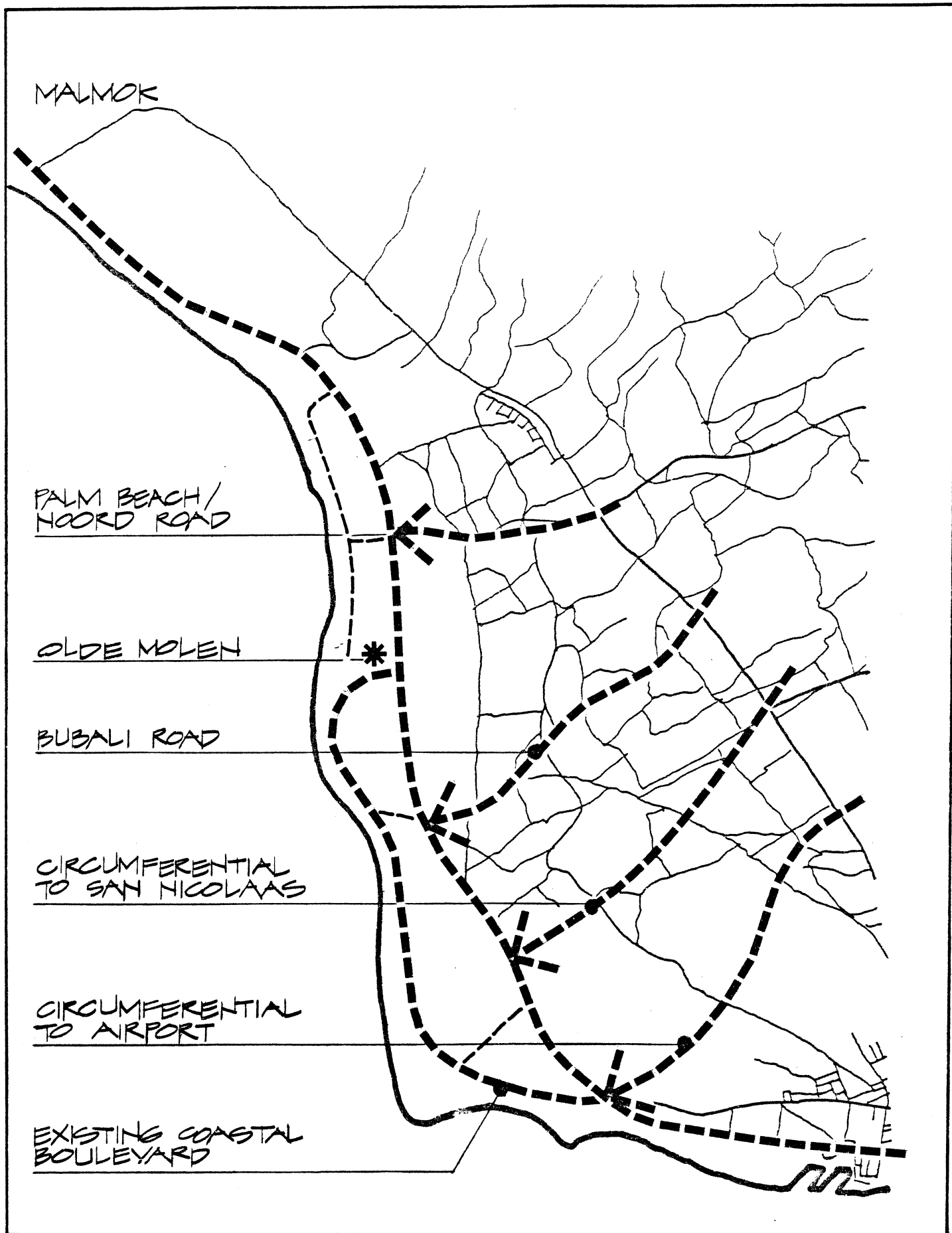
This alternative combines elements of both the Coastal Arterial and the Inland Arterial. The Dual Arteries alternative refines the recommendations of the Physical Development Plan, which called for the development of an inland connector, and includes the planned relocation of L.G. Smith Boulevard at Palm Beach and Eagle Beach. This alternative provides the most favorable opportunities for the future development of the Tourism Corridor.

The Dual Arteries plan provides an alternate, direct route for traffic to Palm Beach and beyond while still maintaining the coastal boulevard as an important tourist corridor. Under this alternative, the coastal boulevard would be downgraded in terms of traffic capacity, but upgraded for pedestrians wishing to cross the road, by the addition of traffic signals, channelization and other pedestrian-priority systems. Reduced capacity and design speed of the coastal boulevard will encourage through traffic to Palm Beach to use the inland arterial. To further reduce traffic on the coastal boulevard, the circumferential roads to San Nicolaas and the airport would terminate at the inland arterial.

In terms of future Tourism Corridor development, there are several advantages to the Dual Arteries alternative:

- Reduced traffic on the coastal boulevard will improve beach access for pedestrians from inland development parcels at Eagle Beach and elsewhere. This will enhance the value of inland parcels for future tourism development.
- Traffic to Horacio Oduber Hospital and the new Free Trade Zone will be separated from coastal tourist traffic on the Tourism boulevard. Access to the hospital and Free Trade Zone from other areas of the island will thus be improved via the circumferential-inland arterial route without causing negative impact on tourist facilities.
- Development potential of Parcels A-1, A-4 and A-5 (1981 Plan) at Eagle Beach will be improved by clearly separating these parcels from the commercial/industrial uses of the Free Trade Zone area. The intersection of the coastal boulevard and the inland arterial will thus serve as a positive "gateway" to the Tourism Corridor.

The Island Government of Aruba should proceed to develop a plan to implement a new dual arterial roadway system in the Tourism Corridor. A recommended alignment is illustrated in figures 7, 8, and 9, which integrates the Dual Arterial system with land use recommendations for the Tourism Corridor. Section III-E describes specific characteristics of the dual artery circulation network in greater detail.



ROADWAY ALTERNATE C : DUAL ARTERIES

FIGURE 6

2. Environmentally Sensitive Zones

As increasing development of the Tourism Corridor occurs, measures must be taken to assure the protection of environmentally sensitive areas both for their aesthetic value and to maintain a critical environmental balance. Two important environmentally sensitive areas deserve special consideration: a) Arashi and California Point, and b) Salinas areas.

a) Arashi and California Point

The unique scenic quality of the Arashi and California Point area is the result of an important balance of natural environmental forces. The cliffs of California Point are the result of glacial changes in the sea-level and tectonic movements of the islands themselves during the Pleistocene and Holocene period. This resulted in the deposition of limestone reefs which later emerged and eroded to form the distinct table like plateau beneath the California lighthouse. This is the only geologic feature of its type in the Tourism Corridor.

The dunes at California Point are another unique geologic formation in this area, formed by the interplay of beach sand deposits at the waters edge and the strong trade winds which have transported the sand inland from the beach to form the finger-like dunes. The result is a landscape where the special environmental forces of Aruba are clearly and dramatically displayed - an asset not only for tourists who wish to explore the Tourism Corridor but for Aruban residents as well who seek an easily accessible "wilderness" experience. Development of the Arashi Valley and California point should thus be carefully controlled to minimize the disruption of these unique environmental systems.



b) Salinas

The Salinas watershed basins running from Malmok to Palm Beach are the second area of environmental concern which must be considered. Historically, these areas are the result of stormwater drainage from adjacent hillsides trapped behind higher elevation beach formations. Evaporation of these water bodies over the years has resulted in high accumulation of salt and other mineral deposits. Periodic flooding and high mineral concentrations have made these areas generally unsuitable for development and difficult to grow vegetation upon.

As increased demand for development in the Tourism Corridor continues, there will be continuing pressure to build within the Salinas areas. In fact, in recent years there have been several proposals to develop major tourism and resident-related projects in the Salinas. Many of these projects have involved the creation of inland lakes by dredging and excavation. Dust problems generated by the Salinas in the Palm Beach area have also resulted in increased pressure to fill or develop these areas as a solution to the dust problem.

Faced with these considerations, the Island Government may follow two alternative courses: develop the Salinas or preserve the Salinas in their natural state.

Salinas development - Development of the Salinas areas has the advantage of providing residential and tourist-related development sites near the beaches and Tourism Corridor. Development of Salinas will also eventually stabilize dust problems. However, the problems of developing the Salinas outweigh the advantages. The Salinas currently play a critical role in environmental protection as a receiving basin for stormwater drainage. Development of these areas will require costly drainage improvements to allow seasonal floodwaters to bypass development to other storage areas or to the sea. Furthermore, the risks of developing within floodwater zones are well documented around the world. Where a shortage of land exists, development of such areas is feasible (though costly), and often necessary. However, in Aruba there is no scarcity of land for development within the Tourism Corridor. As the Phase I Physical Development Plan illustrated there is more than enough land to meet the requirements of 20-year high growth demand projections. Also, if developed, landscape improvement of the Salinas will require the importation of higher quality soils at substantial cost. Water bodies excavated from the Salinas are of low quality, high in salt content, and difficult to make attractive. With the high quality of the beach and sea at the Tourism Corridor, the development of inland lagoons is impractical and should be discouraged.

Salinas preservation - The alternative to Salinas development is Salinas preservation. Although currently rather barren and dusty in dry seasons, there are several positive advantages to

the preservation of the Salinas areas. The most important is their role in stormwater retention, helping to preserve the environmental balance of the area at little or no cost. If stabilized for dust control and carefully improved with selected plantings, pedestrian connections, etc., the Salinas can provide attractive open space and long vistas for surrounding residential neighborhoods. The Salinas will also provide an effective buffer or transition zone between residential areas and the Tourism Corridor.

Considering the relative advantages of Salinas preservation versus Salinas development, it is recommended that the Island Government of Aruba pursue a policy of Salinas preservation and stabilization in the years to come. Experiments at stabilization and enhancement of Salinas areas through planting of salt tolerant species should be initiated immediately. "Recommended Land Use" Plans (Figures 7 and 8, following page 23) illustrate conceptually the organization and enhancement of Salinas areas and adjacent tourism and residential development zones.

3. Planting and Revegetation

An important aspect of future development within the Tourism Corridor will be the quality of the landscape that is created through planting and revegetation. Being essentially a desert environment, Aruba is somewhat unique among Caribbean tourist destinations and therefore not what most first time visitors to the island have come to expect from a Caribbean beach resort. On the other hand, the unique desert vegetation of Aruba distinguishes the island from other Caribbean Islands and can provide a distinct and memorable environment if developed properly. Furthermore, the natural constraints presented by the limited supply of sweet water dictate that corridor-wide landscape planting and revegetation concepts must be established as part of planning efforts for the Tourism Corridor. The following objectives have been identified for planting in the Tourism Corridor.

- Use native plant varieties and methods that are in harmony with, and dramatize the desert environment of Aruba.
- Minimize water consumption, particularly high quality sweet water from domestic sources.
- Where possible use plantings to achieve multiple benefits beyond simple aesthetic benefits (i.e., wind screening, food production, soil stabilization, etc.).

To accomplish these objectives, future development throughout the Tourism Corridor, particularly in inland areas, should be planned to incorporate the following planting and revegetation concepts:

- 'Oasis' concept: Landscape development should be encouraged to create 'Oasis' effects throughout the Tourism Corridor. Intensive planting of exotic, water demanding plants should be focused into distinct nodes rather than attempting to 'green' the entire desert. In areas between these intensively developed 'oases', native plant materials should be used, selected for their interesting foliage effects, ability to provide shade, screening, and background effects.

The oasis concept will provide several benefits. By restricting the area of water-demanding planting, limited water resources will be most efficiently used. Targetting available water supplies to specific areas will also control the quantity and expense of water supply infrastructure to specific points. Perhaps most important, however, a concept of oasis nodes will dramatize the unique qualities of the Aruban landscape which will provide a memorable experience for tourists unfamiliar with a desert environment. The desert corridors between the oases must therefore be considered equally as important as the green oasis gardens, and desert planting must be selected carefully. This will be discussed in greater detail in Section III-F.

- Agriculture: In recent years the Aruban Government has embarked on an ambitious program to encourage agricultural development on the island. The development of viable agriculture is limited, however, by a lack of high quality soils on the island and relatively low total rainfall; the same factors that limit the amount and type of ornamental planting possible. Although there are indications that agriculture was once more extensively practised on the island, at present only a few small areas near Fontein, Noord and Bubali are actively farmed.

In 1975, the Water Resources Development Program prepared for the Department of Economic Development by Finkel and Finkel Engineers found that extensive areas of soils with agricultural potential exist in the areas of Noord, Bubali, and Westpoint, adjacent to the Tourism Corridor. Although not actually within the Tourism Corridor some areas of these soils appear to fall in the zone between the tourism beach areas and the surrounding residential area. Many of these areas of high quality soil are easily visible from the coastal boulevard. As the Finkel Study was general in nature, it is reasonable to assume that additional areas of high quality soils may be found through site specific investigations in areas near those shown by Finkel.

As part of the planting and revegetation efforts for the Tourism Corridor, agricultural development projects should be promoted, where possible, within or directly adjacent to the tourism areas. Certain agricultural commodities, notably orchards, row crops, and flowers, can provide positive aesthetic benefits as background planting and distant views. By encouraging agricultural development at specific nodes adjacent to the Tourism Corridor, scarce water resources may be employed for the double benefit of improving the aesthetic value of the area for tourism and producing food for consumption. The role of agricultural planting in the Tourism Corridor is discussed more fully in Section III-F, "Planting and Revegetation Concepts." The mix of agricultural and other developed uses is illustrated conceptually in Figures 7, 8, and 9, following page 23.

III. TOURISM CORRIDOR DEVELOPMENT PLAN

III. TOURISM CORRIDOR DEVELOPMENT PLAN

Figures 7, 8, and 9, on the following pages, illustrate the Tourism Corridor Development Concept Plan for the area from California Point to Oranjestad. The plan refines the preliminary concepts of the Phase I Physical Development Plan and accommodates certain recent government and private developments as outlined in Section II-B. Only public and private development proposals which are consistent with future development objectives for the Tourism Corridor are specifically identified. Other development proposals which are not shown may also be appropriate in the Tourism Corridor. These projects will require a case by case review to assure their compatibility with the overall planning objectives presented here. The purpose of these plans is not to provide detailed review of all pending development proposals, but rather to establish a framework within which future development of the Tourism Corridor may occur.

It should be noted that the Plan includes recommendations for the Malmok/Arashi and California Point areas which were not included in the 1981 Physical Development Plan.

The plan is based upon the adoption of a Dual Arterial roadway network (Alternate C) as the basis for vehicular circulation throughout the Tourism Corridor. In addition, important salinas areas and environmental zones of corridor - wide importance are identified for preservation or special treatment. As an element of Tourism Corridor development, areas of potential agricultural use have also been identified. These areas are illustrative of concept only since detailed soils investigations must be made to determine the viability of agriculture adjacent to the Tourism Corridor. For purposes of this concept plan, agricultural parcels have been identified in areas near or within the areas identified in the Water Resources Development Plan of 1975, where acceptable soils may be expected to extend. Agricultural uses which would be acceptable along the Tourism Corridor are discussed in Section III-F.

The following sections discuss planning recommendations for each section of the Tourism Corridor in detail beginning with the Arashi/Malmok area.

PEDESTRIAN TRAILS TO
SECLUDED BEACHES

LIMITED SCENIC ROAD

VEHICAL BARRIERS TO RESTRICT
UNCONTROLLED VEHICULAR
MOVEMENT. SMALL PARKING AREAS
FOR VIEWPOINTS, TRAILS, PICNIC SITES.
DUNE PRESERVE
FOOTPATHS ONLY

CALIFORNIA LIGHTHOUSE VISITORS
CENTER AND OBSERVATION AREA

VIEWPOINT, MUSEUM, ORIENTATION MAPS,
INTERPRETATIVE CENTER

PUBLIC CAMPGROUND

ARASHI VALLEY PRESERVE

LIMITED ROADWAYS
FOOTPATHS
NATIVE VEGETATION
AGRICULTURAL DEVELOPMENT WHERE FEASIBLE

RIDGELINE DEVELOPMENT SETBACK

RESTRICT DEVELOPMENT TO PRESERVE
VISUAL QUALITY OF ARASHI VALLEY.

PRIVATE LAND

ENCOURAGE RESIDENTIAL DEVELOPMENT
AT 10.7 METER HEIGHT LIMIT.

EXISTING RESIDENTIAL SUBDIVISION

HILLTOP PRESERVE

LIMIT DEVELOPMENT IN THIS AREA
TO PRESERVE NATIVE VEGETATION.

PUBLIC BEACH PRESERVE

SMALL PARKING AREAS, PUBLIC BEACH
ACCESS, PICNIC SITE.

NEW RESIDENTIAL AREAS

RESIDENTIAL TRANSITION ZONE

SMALL SCALE RESIDENTIAL USES
AGRICULTURAL DEVELOPMENT WHERE FEASIBLE.

PUBLIC BEACH

SMALL PARKING AREA, PICNIC SITES,
SPECIAL 'OASIS' PLANTING.

MATCH LINE

PUBLIC BEACH

SMALL PARKING AREA, PLEIC STOPS,
SPECIAL 'OASIS' PLANTING.

MATCH LINE

NEW BEACHFRONT DEVELOPMENT PARCELS

PUBLIC BEACH ACCESS

PRIVATE LANDS

ENCOURAGE DEVELOPMENT AT RECOMMENDED
HEIGHT AND DENSITY FOR PALM BEACH.

INLAND CONNECTOR TO BEACH

PUBLIC BEACH ACCESS

PALM BEACH HOTEL DISTRICT

HIGH RISE HIGH DENSITY HOTEL DEVELOPMENT.
RESTRICT DEVELOPMENT TO WEST OF NEW INLAND ARTERIAL
HEIGHT LIMIT : 30 METERS.

PUBLIC CONNECTOR TO BEACH

DISCONTINUE L. G. SMITH BOULEVARD

OLDE MOLEN WINDMILL

AQUARIUM

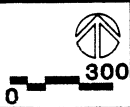
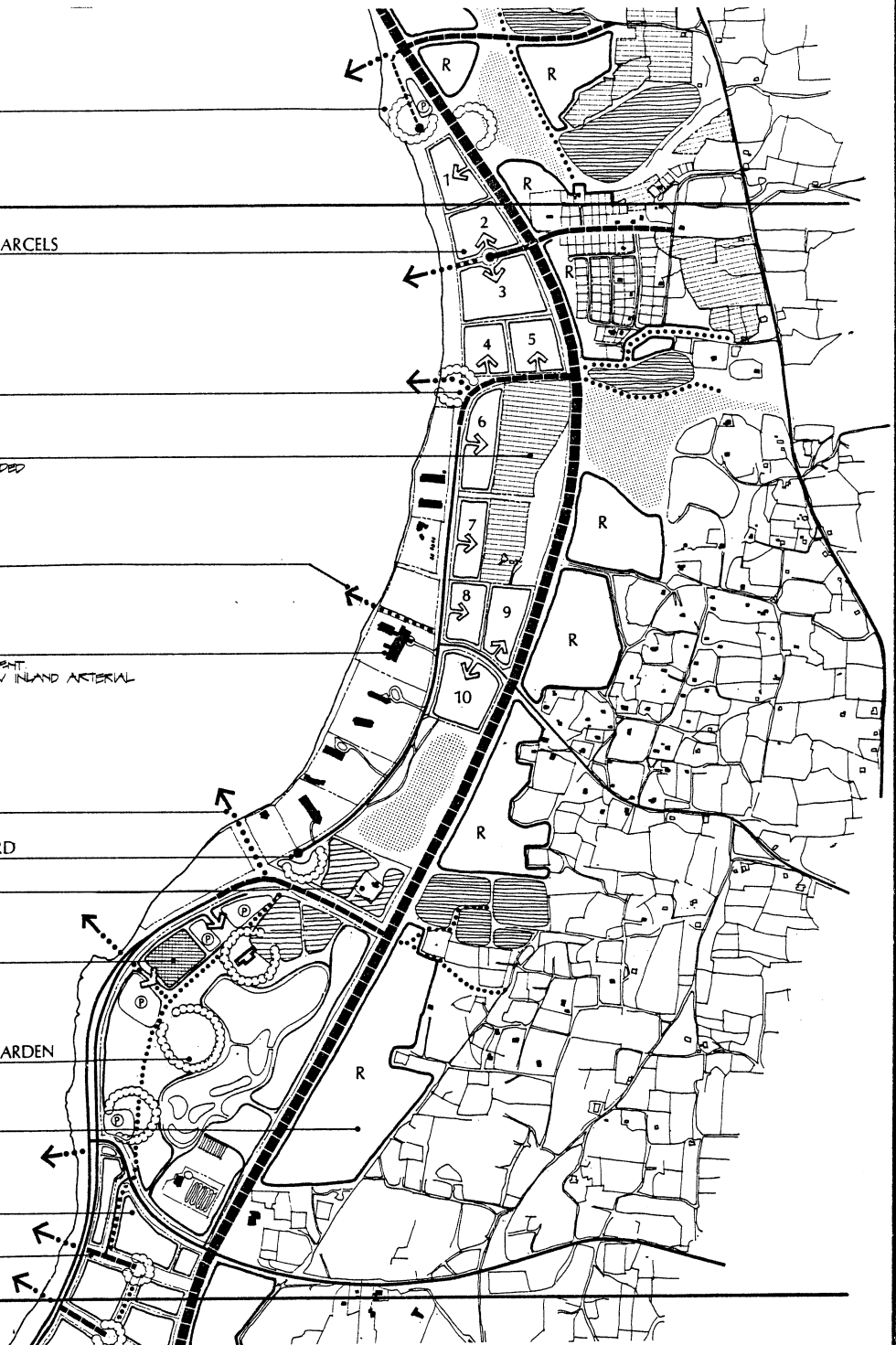
WILDLIFE SANCTUARY/BOTANICAL GARDEN

RESIDENTIAL TRANSITION ZONE

RECREATION CLUB

INLAND CONNECTOR TO BEACH

MATCH LINE



RECOMMENDED
LAND USE

ARUBA TOURISM DEVELOPMENT PLAN

SASAKI ASSOCIATES, INC.

PLANNING, ARCHITECTURE, LANDSCAPE ARCHITECTURE, URBAN DESIGN, CIVIL ENGINEERING, ENVIRONMENTAL SERVICES
64 PLEASANT ST. WATERTOWN, MASSACHUSETTS 02172 SA 1141 AUGUST 1982

SHEET

8

Rev. January 1983

WILDLIFE SANCTUARY/BOTANICAL GARDEN

RESIDENTIAL TRANSITION ZONE

RECREATION CLUB

INLAND CONNECTOR TO BEACH

MATCH LINE

EAGLE BEACH HOTELS

SMALL LOW RISE HOTELS AND
CONDOMINIUMS, 100 UNITS OR
LESS, 15.2 METER HEIGHT LIMIT.
SEE DETAIL PLAN.

EAGLE BEACH VILLAGE

TOURIST COMMERCIAL
FACILITIES

INLAND CONNECTION
TO BEACH

PRESERVE OPEN BEACH FOR
PUBLIC ACCESS AND VIEWS.

DRUIF BEACH AREA

LARGE LOW RISE HOTELS, HEIGHT LIMIT 15.2 M.

GATEWAY TO TOURISM CORRIDOR

REALIGN COASTAL BOULEVARD

BEACH SAND NOURISHMENT AREA

CONTOUR SAND MOUNDS TO ALLOW VIEWS TO SEA
FROM COASTAL BOULEVARD.
PLANT MOUNDS ON BOULEVARD SIDE TO
STABILIZE SAND AND ENHANCE VIEWS.

HOTELS SCHOOL

CONTAINER PORT

CIRCUMFERENTIAL TO SAN NICOLAAS

HOSPITAL RELATED EXPANSION
OFFICES, LABORATORIES, ETC.

NEW INLAND ARTERIAL ROAD

INSTITUTIONAL OR RESIDENTIAL USES

CIRCUMFERENTIAL TO AIRPORT

FREE TRADE ZONE EXPANSION

LEGEND



SPECIAL PLANTING
"OASIS" NODES



PUBLIC BEACH PARKING



SALINAS PROTECTION AREAS



AGRICULTURAL DEVELOPMENT
AREAS



RESIDENTIAL DEVELOPMENT
AREAS



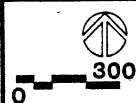
NEW ARTERIAL ROADS



NEW COLLECTOR ROADS



PEDESTRIAN CONNECTIONS
TO BEACH



RECOMMENDED
LAND USE

ARUBA TOURISM DEVELOPMENT PLAN

SASAKI ASSOCIATES, INC.

PLANNING, ARCHITECTURE, LANDSCAPE ARCHITECTURE, URBAN DESIGN, CIVIL ENGINEERING, ENVIRONMENTAL SERVICES
64 PLEASANT ST. WATERTOWN, MASSACHUSETTS 02172 SA 1141 AUGUST 1982

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Rev. January 1983

A. Arashi/Malmok

1. Arashi and California Point

The 1981 Physical Development Plan identified the rugged north coast of Aruba, extending from California lighthouse to Boca Grandi as "perhaps the second most important tourism related natural resource. The rugged and often very rocky coastline is paralleled by some of the highest topography on the island. These features combine to create a dramatic desert environment which is in large part devoid of any signs of human settlement...the preservation of the natural character of the islands North Shore from California lighthouse to Boca Grandi should be a high priority...government policy should be directed to protecting the area from unplanned and inconsistent uses."

The wide valley at Arashi is the beginning of the extensive area of natural diversity described above. This valley, at the extreme northern end of the Tourism Corridor, is the nearest, and most easily accessible area of the north coast to the rapidly urbanizing areas of the Tourism Corridor. It is also experiencing the beginning stages of development. As development of the Tourism Corridor increases, pressures to develop the area can be expected to increase significantly. The valley thus represents an important transition area between the rugged north coast beyond the California Light and the rapidly developing areas of Malmok and Palm Beach. As such, measures should be taken to limit development to uses that are appropriate to a transition zone between urban and 'wilderness'.

The importance of the Arashi Valley as a transition area to the north coast should not be underestimated. Directly north of Arashi and the California lighthouse lies an area of great geologic and scenic diversity which should be preserved in its natural state and included in the North Shore National Park referred to in the 1981 Physical Development Plan. The area is largely composed of limestone cliffs and great windswept dunes (See Section II-C). Uncontrolled vehicular travel within the area of the dunes should not be permitted as it will damage fragile dune grasses and subject the existing dunes to erosion by wind. This may in time, result in the loss of the California Dunes. Although vehicles do not present much of a problem in the area today, as development increases in the Tourism Corridor, rising use of dune buggies and other vehicles can be expected. Development of California Point should thus be limited to the following:

- . Footpaths and Bicycle Paths
- . Picnic sites with shelters and provisions for outdoor cooking
- . Limited paved drive to a viewpoint at the California Light and to the scenic beach inlets of California Point.

As the transition between the developed tourism corridor and California Point, development in the Arashi Valley should be limited to the following:

- . Parking for access to footpaths and bicycle paths of California Point.
- . Parking for beach uses
- . Picnic sites with shelters and provisions for outdoor cooking
- . Public campground
- . Interpretive center/park headquarters with the following facilities:
 - Ranger station with jurisdiction over northern area of the proposed North Shore National Park,
 - Information facilities, guidebooks to island flora and fauna, trail maps, etc.
 - Small museum with interpretive displays of area geology, coastal forces, observation areas, etc.
 - Public restrooms,
 - First Aid facilities,
 - Limited park maintenance facilities.
- . Agriculture:

In addition to the above mentioned uses, certain agricultural uses are compatible with the objectives defined for the Arashi Valley. Like the Tourism Corridor generally, these uses should be restricted to irrigated land-based row crops or orchards. A managed reforestation program might also be effective in the area if carefully planned. Hydroponic greenhouses or animal husbandry operations are incompatible with these objectives. Compatible agricultural uses are discussed more fully in section III-F.

Figure 7 illustrates the type and conceptual arrangement of facilities in the Arashi/California Point area. The actual facilities to be developed and the location of the interpretive center, camping facilities, small scale access roads, etc. must be determined as part of the full development program for the North Shore National Park to assure that the facilities design is within guidelines established for the park as a whole.

Early Action

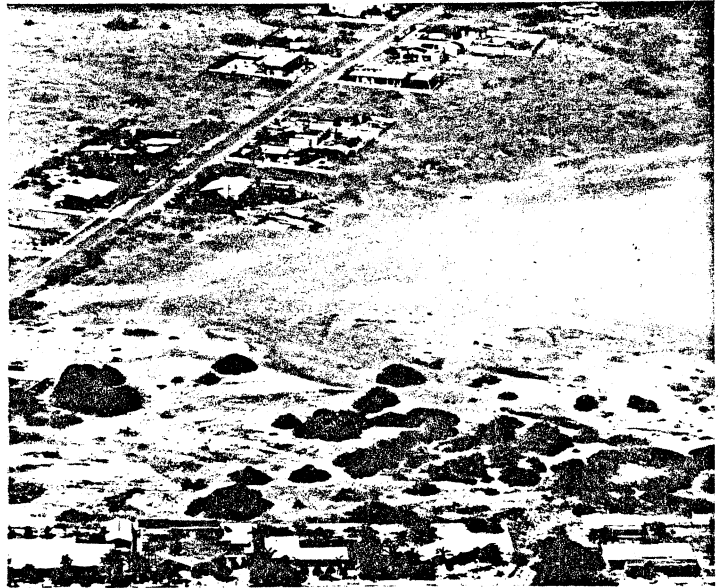
As the first stage of planning for the Arashi area the following actions should be taken:

- Halt all further development of private residential or commercial facilities within the valley. A moratorium on further leases should be established pending the completion of master planning and guidelines for the North Shore National Park.

- Measures to restrict vehicular access in the valley to certain designated travel ways should be initiated. Free roaming access of off-road vehicles should be restricted to official vehicles only.
- Studies to determine the viability of soils in the valley for agricultural purposes should be initiated.

2. Malmok

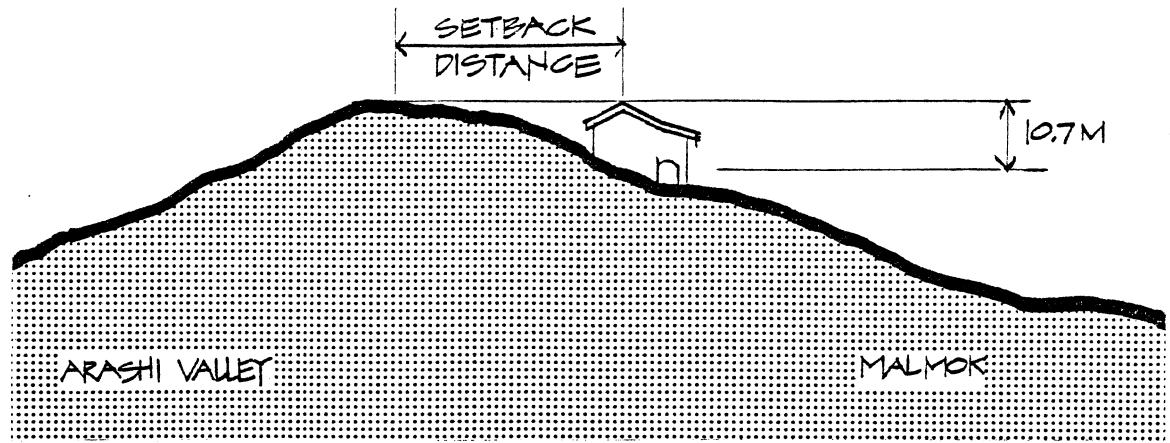
The Malmok area is today the northernmost developed area of the Tourism Corridor. Currently, development is limited to a few residential compounds stretching along L.G. Smith Boulevard and Malmok Road (Weg Van Malmok). The area is undergoing extensive pressure for development, however, with newly planned subdivisions extending along the beach into the Arashi Valley and onto the hillside above the Malmok Road. The subdivisions along the Malmok Road have not yet reached the crest of the ridge to become visible from within the Arashi Valley or from the California Lighthouse, but as development pressure increases, subdivisions can be expected to break the crest of the ridge.



To the east of L.G. Smith Boulevard, extensive undeveloped Salinas areas exist. Beyond the Salinas, the transition zone to residential areas along the Westpoint Road is experiencing new residential development. The 1975 Water Resources Development Plan also identified several areas of land with agricultural potential in this transitional zone.

It is clear that a growing demand for residential and tourism development in the Malmok area will occur in the years to come. The type and quality of residential development that has occurred so far in the area is not incompatible with the planned uses of the Tourism Corridor. However, new development of the Malmok area should proceed according to the following guidelines to assure that future development is compatible with the quality of development sought for the Tourism Corridor.

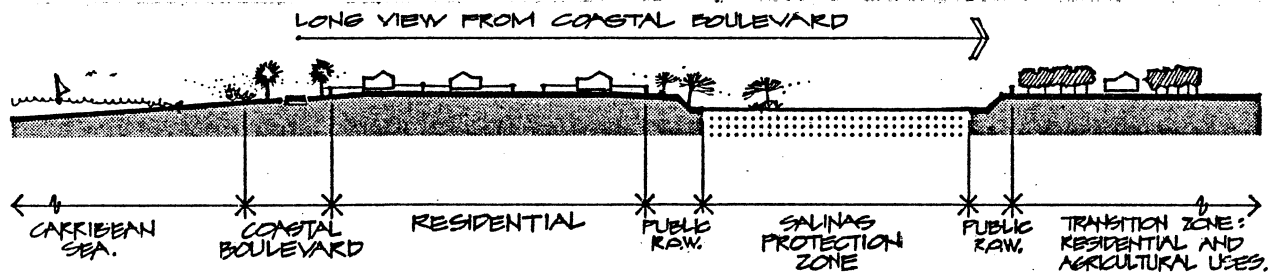
- Development throughout the Malmok area should be within the height and scale of existing development in the area. For these purposes, a height limit of 10.7 meters (35 feet) should be established throughout the district.
- Hillside subdivision development above the Malmok Road should not encroach beyond a "Residential Setback" from the crest of the Arashi Valley ridge. The setback shall be established by the relationship of the height of proposed building development and the slope of the development site such that no building development shall encroach visually into the Arashi Valley. See following page.



MALMOK RIDGELINE DEVELOPMENT SETBACK

FIGURE 10

- Above the Malmok Road near the crest of the ridge is an extensive area of well developed native vegetation. This area should be preserved in its native condition to serve as a visual screen between the developed areas of Malmok and the natural areas of Arashi/California Point (see figure 7.)
- To the east of L.G. Smith Boulevard, beyond the existing line of houses, residential subdivisions of the existing type and scale should be planned.
- Salinas preserve areas should be incorporated into the overall planning of new residential subdivisions in the area. The salinas should be designed to provide for needed stormwater retention as well as continuous open space vistas and pedestrian/bikeway linkages. Stabilization of salinas preserve areas with salt tolerant grasses and other methods should be undertaken.
- Beyond the salinas preserves, the Transition Zone should be planned for residential and agricultural uses, with consideration for visual impacts on the long views from the Tourism Corridor. Wherever possible, agriculture development sites should be located to maximize their visual impact on views from the Tourism Corridor.



MALMOK SALINA ZONE SECTION

FIGURE 11

- All beach areas to the west of L.G. Smith Boulevard should be maintained for public use. Beach development should be limited to small scale parking areas (up to 20 cars) screened with native vegetation, picnic facilities and sun shelters.
- Planted nodes and residential areas should be linked by pedestrian/bikeway connections to the beach for the use of residents and tourists along the Tourism Corridor.

Early Action

As the first stage of planning for development in the Malmok area, the following actions should be taken:

- Building lots in the existing subdivision above Malmok Road which fall within the 10.7 meter setback zone of the Malmok/Arashi ridge should be demapped. No further development leases should be granted unless strict height limits are maintained.
- Studies should be conducted prior to further residential development to determine areas of suitable agricultural soils for the development of 'oasis' nodes of agricultural and ornamental planting. Optimum agriculture development sites should be identified.
- Salinas stabilization experiments using salt tolerant grass species and other planting methods should be initiated immediately.

B. Palm Beach

The Palm Beach area was identified in the Physical Development Plan as the area where all high rise hotel development in the Tourism Corridor should be encouraged. Currently approximately 1500 hotel rooms exist in the Palm Beach area with lease applications for up to 1200 additional rooms under consideration by government agencies. High projected demand for the Palm Beach area, including all major anticipated expansions, new projects, and existing rooms, is up to 3800 rooms over the next 20 year period.

To accommodate this demand, the 1981 Physical Development Plan anticipated the development of over 500 hotel units inland of L.G. Smith Boulevard in parcel C1. Alternatively, several additional parcels (D1, D2, D3, and D4) were identified for possible development to accommodate growth projections. Since existing and proposed development has filled most available beach frontage in the Palm Beach area, inland development will be necessary to accommodate additional tourism demand.

Recently, the Department of Works (DOW) has considered plans to relocate L.G. Smith Boulevard in the Palm Beach area. This planned realignment of the coastal boulevard will provide the following benefits:

- The creation of approximately 47 hectares of developable land with easy beach access. This includes approximately 9.5 hectares of privately-owned property lands. At recommended high density guidelines of 125 hotel rooms per net hectare, newly available development parcels will thus accommodate approximately 4700 rooms, well in excess of high demand projections of 3800 rooms for the Palm Beach area over the next 20 years.
- The newly created beachfront parcels reduce the need for development of inland parcels number C1, C2, C3 and D1, D2, D3 and D4, much of which is existing salinas. On-site inspection of salinas areas and discussion with local officials raises substantial questions concerning the advisability of large scale development in the existing salinas areas. As discussed in Section II-C, the development of these areas raises questions of environmental protection and, therefore, the establishment of salinas preserves in the Palm Beach area should be pursued. The realignment of the coastal boulevard in conjunction with the dual arteries traffic system allows the preservation of Palm Beach salinas areas to occur while additional high quality hotel demand is met.

Figure 8 illustrates recommended land uses for the Palm Beach area. The plan incorporates proposed boulevard relocations and new coastal development parcels as discussed above. In addition, future

development of the Tourism Corridor should be in accordance with the following guidelines:

- Development Density - High density, high rise hotels should be developed to the west of the new interior arterial according to the high density criteria established in the 1981 Physical Development Plan. These criteria provide for development of up to 87 dwelling units or 125 hotel rooms per net hectare. These density criteria will control building bulk to mitigate the negative impact of hotel development on the residential areas near the Tourism Corridor and assure the preservation of substantial areas of open space in the high rise district. Section III-18 of the 1981 Physical Development Plan clearly discusses the problem of uncontrolled development heights in the Tourism Corridor:

"The height of the buildings in Palm Beach raises a basic issue of visual quality exemplified by the construction of the Concorde Hotel. Basically, the hotels constructed in the seven to ten-story height range are low enough to be acceptable from a visual point of view. The presence of palm trees surrounding these structures alleviates their height and blends them into the Aruban landscape in an effective manner. However, the structures such as the Concorde Hotel which exceed the ten-story height are dramatic, visual elements which if perpetuated could create a very negative image for the hotels in this district. Basically, hotels in the twenty-story range are much more reminiscent of hotel developments in major cities and not at all in keeping with the character of the Aruban landscape and townscape."

For these reasons, maximum building height of principal and auxillary structures should be set at 36 meters (120 feet) as shown in Table IV-2 of the 1981 plan.

- High density, high rise hotel development of Private Lands within the Palm Beach area should be encouraged to follow the development guidelines for the Palm Beach area wherever possible. Land exchanges with the owners of these private lands should be pursued to assure more logical development of the area.

- Residential development in the Transition Zone adjacent to Palm Beach should be a maximum height of 10.7 meters (35 feet) in all development areas to assure compatibility with the height and scale of existing residential development in the neighborhoods surrounding the Tourism Corridor.
- Salinas preserve areas should be incorporated into the overall planning of new residential and commercial development of the area for environmental protection and open space continuity between Malmok and the Olde Molen botanical/wildlife garden.
- Beyond the salinas preserve, the transition zone should be planned to accommodate agricultural uses where possible. Studies should be conducted in agricultural areas shown in Figure 8 prior to further residential or commercial development to determine areas of suitable agricultural soils.

C. Wildlife Park and Botanical Garden

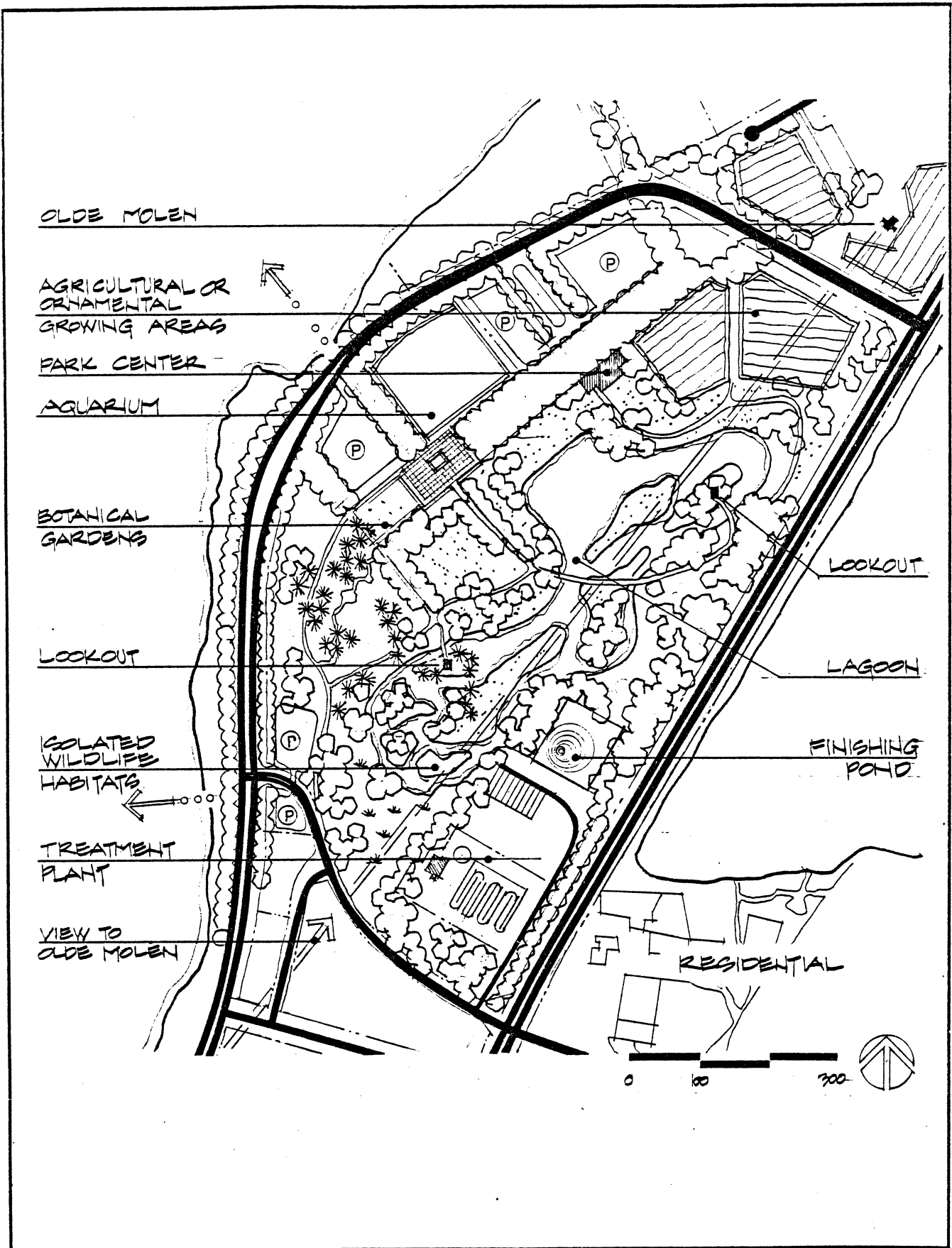
The 1981 Physical Development Plan identified the area adjacent to the existing sewage treatment plant at Palm Beach as a parcel of land with "potential for creating a special landscape character based upon the availability of effluent from the sewage treatment plant... The open space created by a park lagoon area is well located to provide variety in the visual character of the tourism corridor. As parcels (in the tourism corridor) are developed, the impact of the park will become significant and will be a positive contribution to the value of surrounding areas."

On-site investigations and discussions with local officials reveal that the existing treatment plant lagoon is abundant with wildlife, particularly birds common to Aruba and the Antilles. In addition many water-loving plant species have grown abundantly in the area directly adjacent to the water's edge and in the lagoon itself. The most prolific of these was an abundance of Water Lily (*Nymphaea*), introduced into the lagoon in the 1970's, which became so rampant that it had to be completely removed recently at significant expense in manpower and equipment. It is clear that the land and water resources of the lagoon are a favorable environment for plant and wildlife habitat and are thus well-suited for an efficiently managed park with wildlife sanctuary and botanical garden. By integrating such important features as the Olde Molden Windmill into the overall development of the area, the opportunity is created for a unique tourism destination which addresses the Dutch heritage of Aruba while displaying the flora and fauna of the island. This can provide a complementary attraction to the facilities of the Tourism Corridor.

In addition, the recent proposal by local private interests to develop a "Sea Life Park" aquarium at this site would be consistent with the theme of the new wildlife park/botanical garden. If carefully integrated with the facilities of the park, a diverse yet co-ordinated recreational attraction can be created through the joint public-private development of the lagoon area.

Figure 12 illustrates conceptually the uses proposed for the lagoon park area and their relationship to the site and existing features. The park will include the following features:

1. Wildlife Sanctuary
2. Botanical Garden
3. Support Facilities



WILDLIFE PARK/
BOTANICAL
GARDEN PLAN

ARUBA TOURISM DEVELOPMENT PLAN

SASAKI ASSOCIATES, INC.

PLANNING, ARCHITECTURE, LANDSCAPE ARCHITECTURE, URBAN DESIGN, CIVIL ENGINEERING, ENVIRONMENTAL SERVICES
64 PLEASANT ST. WATERTOWN, MASSACHUSETTS 02172 SA 1141 AUGUST 1982

SHEET
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1. Wildlife Sanctuary

Birds of the Caribbean region will be the primary focus of the wildlife component of the park. Species native to Aruba and the Netherlands Antilles will be most common, but species from other areas of the Caribbean will be encouraged by consideration of their habitat in the design of the sanctuary area.

In the design and operation of wildlife preservation areas, three alternative goals are commonly considered:

- a. Maintenance of existing species and population sizes.
- b. Maximum diversity of different species.
- c. Maximum population size of target and/or existing species.

In Aruba, initial efforts should be made to plan for a combination of 'a' and 'b' thereby maximizing diversity of wildlife species while maintaining existing species and population sizes. Wildlife species will be primarily local colonial nesting waterbirds. Certain other species of the Caribbean region may be encouraged through consideration of habitat design. The existing avian community, which should be considered in the initial design, consists primarily of Herons, Egrets and Ibises, including:

- Green Heron
- Great Egret
- Showy Egret
- Black Crowned Night Heron
- Glossy Ibis
- White Ibis

Following initial establishment of habitats to maximize the population of local species, future management of the bird sanctuary may consider increasing the diversity of different species by the creation of new habitats and the introduction of more exotic species from a wider range of the Caribbean and South America.

Maintaining the population sizes of these species in the presence of increased development and tourist activity will require the use of management techniques which reduce the number of harmful human/wildlife encounters. In other words, critical habitats (particularly nesting areas) should be separated and shielded from areas subject to intensive human use (i.e., Olde Molden Windmill, botanical gardens, etc.). Therefore, a wildlife sanctuary zone should be created with limited accessibility. It is recommended that several islands (particularly valuable nesting sites) be created within this zone. These islands should be vegetated with local plant species.

In addition to maintaining existing populations, new species may be attracted to the area if the following conditions are met.

- Water must be present at all times and levels must be controllable. Depth of water is the major factor limiting the value of an area to water-oriented birds (wading birds, waterfowl, etc.).
- The bottom of the lagoon area should be contoured in a terraced manner so as to provide broad areas of variable water depth. This is important because different species require different depths. For example, the optimum depth for the Great Egret is approximately 17 cm, whereas the optimum for the Snowy Egret is approximately 8 centimeters. The terraces should be created along the edges of the lagoon and islands and contoured at intervals of 5 centimeters to a maximum depth of 20 centimeters. The interior portions of the lagoon may have more substantial depths.
- Salinity, pH, and especially turbidity should be controlled. Although some species of wading birds are tactile foragers (locating food by the sense of touch), most feed by sight. Turbidity should not be allowed to exceed 30 jtu.
- A diverse community of aquatic plants should be encouraged to colonize the sanctuary area. Diversity of vegetation is directly related to diversity of wildlife. Again, all plant species should be native to the region.

In Aruba, water quantity and quality are the most important early considerations in planning the bird sanctuary. Initial design of facilities must be based on reliable estimates of long term water availability.

Water Quantity

Currently, the primary use for water from the sewage effluent lagoon is for irrigation of public planting along the coastal boulevard. As a result of this low water reuse, the lagoon has grown in size to approximately 16.3 hectares (40 acres). This is based on a current estimated daily flow of 800-1200 cubic meters per day from the sewage treatment plant into the lagoon.

In future years, several planned uses will compete for water supply from the treatment plant lagoon. The largest single use will go to agricultural development projects planned for the Noord area. Commitments of 400-600 cubic meters per day

have already been made for these purposes. The size of the treatment plant lagoon is influenced primarily by direct evaporation from the water surface, although an undetermined amount is utilized at present in watering trees. In order to reduce losses due to evaporation, the proposed lagoon should have a much smaller surface area than the present lagoon. The calculations shown on the following page illustrate the conceptual design of the proposed lagoon taking into consideration three primary factors: a) reduced surface area, b) presently planned use of effluent, and c) proposed additional use of effluent. The calculations provide a conceptual water budget for use of the treatment plan effluent.

Residual Water Supply for Lagoon Design

- Supply:

Existing daily flow:¹ 1200m³/day
Additional flow by 1990 ² : 640m³/day

Estimated daily flow(1990): 1840m³/day

- Demand: (Water Budget):

Planned agricultural use: 500m³/day
Target Landscape Irrigation
(1985-1990)³: 500m³/day
Additional agricultural use⁴: 340m³/day
Target evapo/transpiration⁵: 500m³/day

Estimated daily consumption: 1840m³/day

- Estimated lagoon surface area⁶: 6 Hectares (14.8 Ac)

Notes:

1. Maximum existing daily flow in optimum conditions. Actual existing daily flow fluctuates between approximately 700-1200 m³/day due to plant operation characteristics.
2. Additional daily flow calculated as follows:
From Phase One vol. 2 (1981)
Additional rooms anticipated 1981-1985: 700
Additional rooms anticipated 1986-1990: 900
Total Rooms 1981-1990 1600

At 200 liters/day per person, 2 persons per room;
700 x 2 x 200 = 280,000 liters/day = 280 m³/day
900 x 2 x 200 = 360,000 liters/day = 360 m³/day

Additional flow 1981-1990 = 640 m³/day
3. Estimates are that 500 m³/day will irrigate ± 10 hectares (25 Ac) of fruit trees (Finkel, 1975). Planting for ornamental purposes will vary. Experience in desert climates with similar evapotranspiration rates indicate that 500m³ day may be required to irrigate ± 7 hectares (17.3 ac) of ornamental planting consisting of trees, shrubs, groundcover and limited grass using spray irrigation. Actual water consumption could be considerably less depending on planting design, use of indigenous species, and irrigation methods.
4. Additional agricultural use: It is assumed that additional water for agricultural purposes will be required if agricultural development programs prove successful. If sites for agricultural development are found adjacent to the Tourism Corridor, additional water supply allocations for agriculture could be applied to these areas.
5. Target evapotranspiration volume based on evapotranspiration rates of 8.5 mm/day (Agriculture Dept., 1982)
6. For water budget purposes a target evapotranspiration volume of 500 m³/day establishes a lagoon area calculated as follows:
 $A \times .0085 = 500$
 $A = 58,824 \text{ m}^2 \text{ or } \pm 6 \text{ hectares.}$

Water Quality

The most significant water quality impacts to the wildlife sanctuary may include excessive nutrient enrichment (resulting in a proliferation of aquatic plant growth); high turbidity (reducing the ability of many birds to find food); and the presence of petroleum residues, pesticides, and other pollutants.

Although excessive concentrations of nutrients (greater than 2000 mg/l nitrates) may cause physiological damage in individuals, of greater concern to the health of the wildlife sanctuary is the excessive algae growth which may occur. As witnessed by the recent proliferation of water lillies, when nutrient levels become excessive so will aquatic growth. Excessive plant growth reduces the ability of sight-feeding wildlife species to obtain food. Also, excessive growth of certain algae species (blue-greens) is toxic to waterfowl. To prevent the proliferation of aquatic plants, every effort should be made to limit the concentrations of nutrients to 0.3 mg/l nitrate-nitrogen, 0.6 mg/l total nitrogen, and 1.0 mg/l phosphate.

As previously stated, turbidity should be controlled and not allowed to exceed 30 jtu. Turbidity levels in excess of this will reduce the ability of sight-feeding wildlife species to obtain food.

Extremely small quantities of pesticides and petroleum residues will destroy the value of the area as a wildlife sanctuary. Both PCB's and DDT are highly persistent in the environment and have been found to destroy the reproductive success of many wildlife species. Petroleum residues are highly toxic to the eggs of waterfowl and other waterbirds. Therefore, these substances must not be allowed to enter the lagoon waters.

Although detailed studies of water quality in the treatment plant lagoon have not been made, officials operating the plant indicate that water quality is between C-3 and S-4 designation. Although the lagoon currently functions as habitat for several species of birds, effluent finishing ponds will probably be required to assure water quality for the type of wildlife sanctuary/botanical garden envisioned.

During the final design phase of the wildlife lagoon it will be necessary to study the best way to upgrade the quality of the effluent discharged to the lagoon. One way to do this is to build a "finishing" or "polishing" lagoon to receive the secondary plant effluent. The effluent would receive further aeration and BOD (Biological Oxygen Demand) reduction in this lagoon. Insofar as the main lagoon will be in a public area, the effluent should be chlorinated prior to discharge to the park lagoon. The effluent could also be upgraded by physical/chemical treatment methods and by filtration and/or carbon absorption. The land area and technology are available to upgrade the effluent at a reasonable cost.

2. Botanical Garden

The Botanical garden component of the new park will include the following:

- Native gardens - Desert plants of Aruba and the Netherlands Antilles;
- Ornamental gardens - Ornamental plants of the Caribbean region and South America;
- Natural gardens - native and introduced species in naturalistic or "wild" setting as habitats for bird sanctuary;
- Agricultural gardens - Special demonstration gardens of selected Aruban agricultural products.

The botanical garden will be planned to accomplish the following objectives.

- a. to provide a green environment for strolling, picnicking, and other forms of passive recreation.
- b. to educate tourist and Aruban visitors to the unique and exotic flora of the Netherlands Antilles and Caribbean Region.

Since educational objectives are not the primary consideration for the creation of the park, botanical displays will stress ornamental qualities rather than scientific qualities. Plant species will be selected primarily for their ornamental effects and ability to evoke a certain landscape character (i.e. Desert gardens, jungle gardens, etc.) In addition, water-supply limitations will determine the extent of high water demand plantings.

Educational objectives will play an important, though not primary, role in the operation of the Botanical Garden. Facilities for plant research, propagation, educational tours for school children, etc. should be incorporated into the planning of the garden to maximize the return to Aruban residents and tourists of the substantial investments required to create the facility.

3. Support Facilities

High market projections from the Phase I Tourism Development Plan (Volume II) indicate that by 1990 as many as 387,000 stay-over visitors may be expected to visit Aruba. With its central location in the Tourism Corridor, a well designed botanical garden/wildlife park will provide an attractive diversion from the beaches for many of these tourist visitors. In addition, the park will provide an important recreational and educational resource for Aruba's 65,000 local residents. Thus, the potential exists for a large number of visitors.

To accommodate these visitors and maximize their enjoyment and understanding of the facilities, the following support facilities should be included within the new park:

- Interpretive center and park headquarters with the following facilities:

- Educational exhibits and displays of regional wildlife and botanical habitats.
- Administration offices.
- Research facilities possibly in conjunction with local university or agriculture department.
- Public restrooms.

- Public Parking:

Public parking should be provided in the new park for two major user groups: Visitors to the wildlife/botanical garden, and visitors to the public beach area adjacent to the Palm Beach hotels. In addition, parking will be required for visitors to the new Sea Life Aquarium and Olde Molen windmill. Although these latter parking facilities will probably be separate, private lots, efforts should be made to co-ordinate all parking facilities to provide safe access-egress to the coastal boulevard and minimize impact of parking on the amenities of the park.

- Trails, viewpoints and lookouts

A system of trails, lookouts and overlooks should be developed throughout the park to minimize adverse impacts of visitors on special plant species, agricultural areas, or habitats of animal species. Footpaths should be designed to assure that people do not stray from designated areas and to avoid contact with the effluent waters of the treatment plant lagoon. Traditional stone walls will give definition to special park areas and provide protection of sensitive gardens or wildlife areas.

- Maintenance Facilities

The new park will require substantial facilities for on-going maintenance and operations including:

- parking and storage for general park maintenance vehicles, tractors, sprayers, etc.;
- wind-sheltered nursery areas and lath houses for plant propagation and research;
- storage for topsoil, fertilizers, mulches, temporary emergency building materials, refuse, etc.;
- fabrication/repair shop;
- maintenance offices.

Early Action

As the first stage of planning for the development of the Botanical Garden/Wildlife Park, the following immediate actions should be taken:

1. Feasibility analysis

- a. Detailed site investigations to determine feasibility of site for development of diverse plant and animal habitats. These detailed investigations should include:
 - Soils sampling and analysis to determine suitability for ornamental and agricultural planting as well as building foundation requirements and earthwork limitations.
 - Water quality analysis to determine suitability for specific wildlife habitats and specialized irrigation needs.
- b. Detailed user analysis to determine specific visitor populations, methods of arrival, facilities required, and anticipated visitor revenues, park administration, and maintenance.
- c. Development cost estimate to determine project feasibility including water quality improvements to sewage treatment plant and site improvements.
- d. Phasing: Based on cost and feasibility analysis, development phasing which conforms to the growth of the Tourism Corridor and future funding sources should be targetted.

2. Preliminary Design

- a. Preparation of site development Master Plan for future development of the park that conforms with phasing objectives and site limitations of feasibility analysis. Detailed facilities programming.
- b. Identification of first phase development program and design of Phase I facilities. Revised cost estimates.

D. Eagle Beach

The 1981 Physical Development Plan defined Eagle Beach as "an area which will most likely be subject to increasing development demands in the future. It is also the type of lower scale hotel development which may be popular with future tourism markets. As such, the architectural scale, outdoor activity areas, and lush landscape developed in these facilities is a desirable example for guiding future development in the tourism corridor."

The plan concluded that the prevailing two and three story height limit should be maintained in the Eagle Beach area and the pattern of heavily landscaped courtyards continued.

Since completion of the Physical Development Plan, the demand for increased development has continued to grow in the Eagle Beach and Druif Beach area. Applications for long-term leases to construct over 1400 new hotel or tourism units are currently under consideration by government agencies (See Section II-B and Figure 3). This total represents 81% of the 20 year high demand projections of the 1981 Plan.

Due to the limited availability of beachfront parcels, most future new development in the Eagle Beach area must occur inland of L.G. Smith Boulevard. Hotel development proposals for the area currently are of two general types: Small scale hotel developments of 40-100 units, and large scale hotel developments of 100 to 650 units. The large hotels tend to be self-contained, largely self-sufficient resorts with a wide range of activities and restaurants and small shops to serve the hotel clientele. The smaller hotels provide accommodation only, with limited additional services. The smaller hotels will rely on outside restaurants and shops to provide most ancillary tourist services. Most of the proposals to date for the Eagle Beach and Druif Beach area are within the 15.2 meter (50 feet) height guidelines of the Physical Development Plan.

The following guidelines for the development of inland parcels in the Eagle Beach area should be followed (See "Recommended Land Use," Figure 9, following page 23):

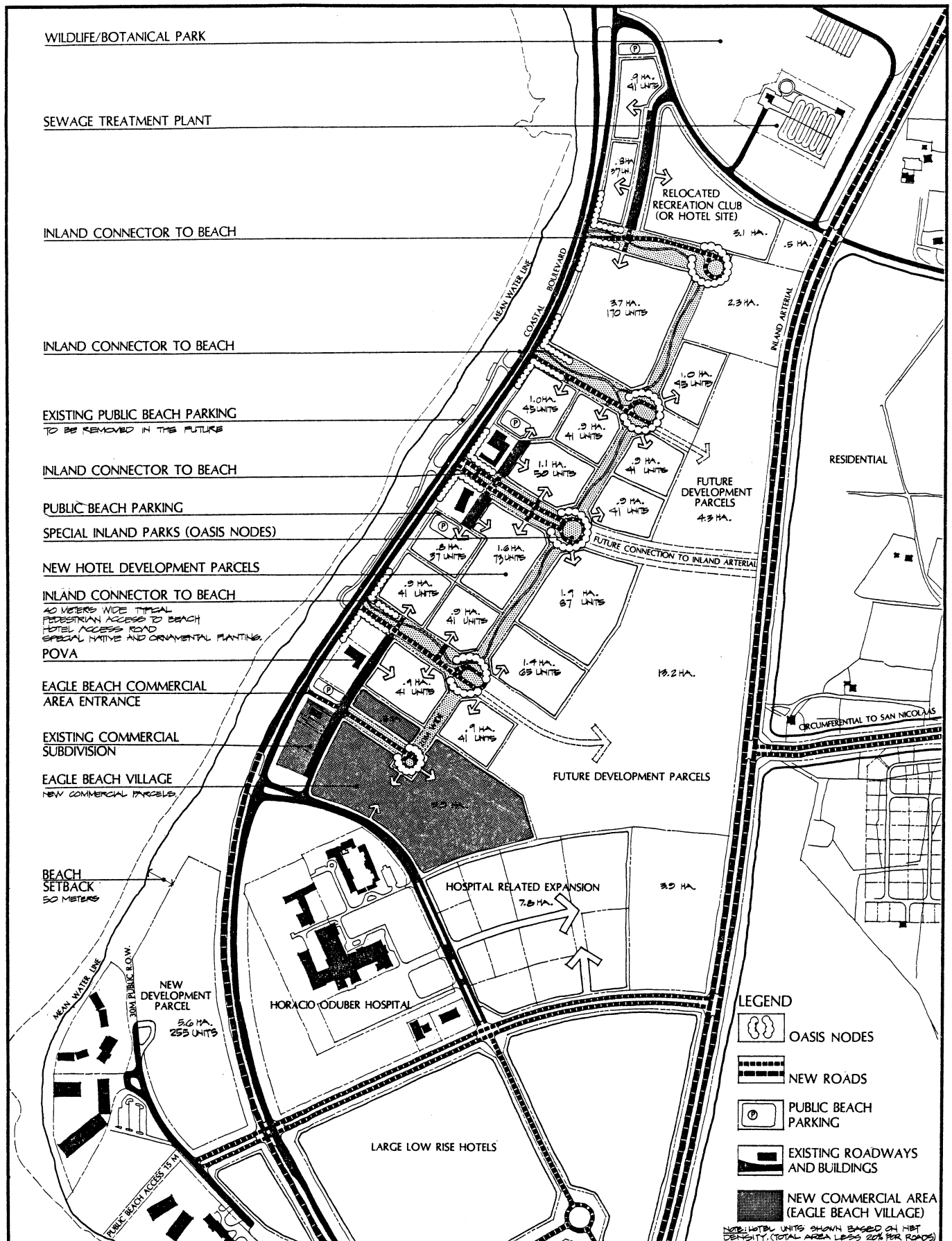
- Small low-rise hotel and condominium developments (100 units or less) should be clustered in the Eagle Beach area north of Horacio Oduber Hospital. (Parcels B2, B3, B6 - 1981 Plan). Smaller hotels can be effectively organized in this location to create a unified tourism environment while providing considerable flexibility for the government in terms of types and sizes of parcel available for lease.
- Large low-rise hotel and condominium projects (more than 100 units) should be developed in the area south of the Horacio Oduber Hospital (Druif Beach area). The prominence of this site area in relation to both Oranjestad and the Tourism

Corridor makes it highly desirable that larger developments with their associated variety of facilities be given 1st priority for this development area.

- Views and pedestrian connections to the beach from the inland development parcels should be maintained along broad open space corridors. The inland connection at Druif Beach is particularly important to provide accessibility to the beach and should be preserved as recommended in the 1981 Physical Development Plan.
- Future expansion for hospital-related development should be provided adjacent to the small hotel development area north of the existing hospital. It is anticipated that doctors clinics, research facilities and small office buildings associated with the hospital will be required and will contribute positively to the overall quality of the area. Sufficient land exists in the area to provide for a reasonable amount of hospital-related growth without consuming valuable tourism development sites.
- Tourist-related commercial development such as restaurants and small shops to serve Eagle Beach should be focused in the area adjacent to the proposed hospital expansion zone on the corner of L.G. Smith Blvd. This will provide a compact area of commercial activity in the Eagle Beach area thereby reducing the risk of unsightly strip development which often blights older tourism resorts.

Commercial facilities should be of a convenience nature, providing needed services for the small hotels of Eagle Beach that are not large enough to provide a range of entertainment and other tourist services. The commercial area should not, however, offer the full range of products available in Oranjestad and should be limited in size. These controls are imperative to prevent commercial development that will compete with Oranjestad and detract shoppers from visiting the central shopping areas of the city, resulting in the economic decline of the CBD.

Figure 13 on the following page illustrates in greater detail the proposed development plan for the Eagle Beach area. The plan is based upon development guidelines established in the 1981 Physical Development Plan and illustrates 20-year projected demand for this area of the Eagle Beach corridor. Additional future demand may be met by parcels B-4, B-5, and B-7 described in that plan, held in reserve for future development if required.



Following are key features of the plan:

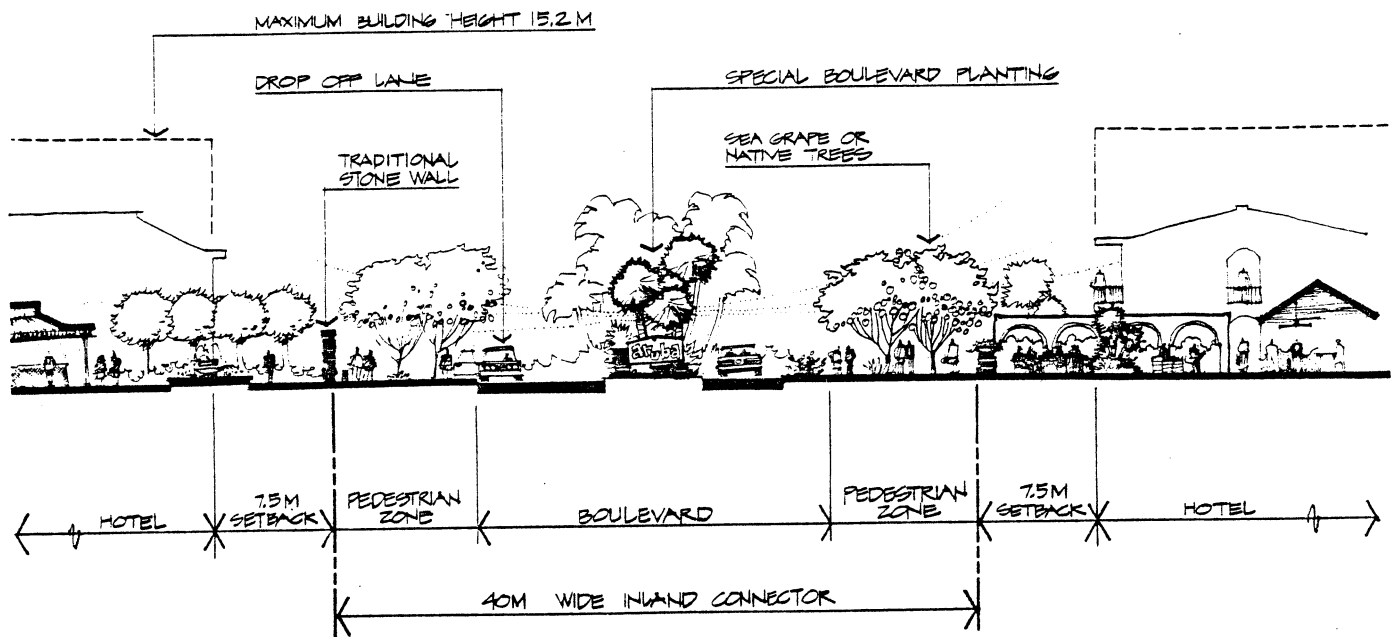
Development Parcels: A range of development parcels are shown based on land requirements for hotels of 40 to 100 units at densities of 57 rooms per net hectare (exclusive of on-site roads and parking). Parcel boundaries are illustrative only--internal boundaries may change to suit locational demand of specific hotel markets or to accommodate expansion of hotel facilities. Large hotel developments in excess of 100 units may be compatible with the smaller scale village character of the Eagle Beach area. However, as a general rule such developments should be encouraged to the south in the Druif Beach area until such time as this area is fully developed.

Inland Connectors: The development of Eagle Beach is structured around broad (40 meters wide) inland connectors or "amenity corridors". As development of the first row of parcels inland of the coastal boulevard is completed, these broad connectors will provide visual, vehicular, and pedestrian access to Eagle Beach. Corridor spacing establishes development units of approximately 3.5 to 4 hectares which may be developed as small sites (40 unit hotels), or large sites (up to 200 units). Phased hotel development is possible with projects beginning small and expanding into additional parcels as market demands.

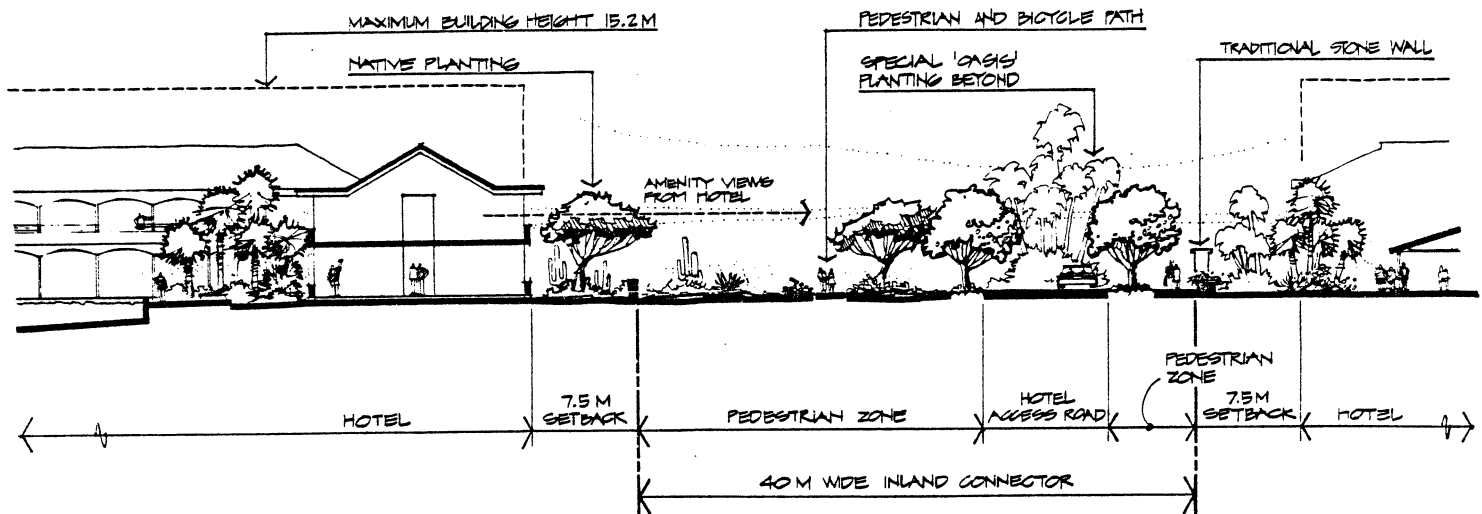
Facilities developed within the corridors may vary. Certain corridors contain parklike boulevards or winding roads for access to inland parcels. Others may remain only as visual open space and pedestrian connectors to the beach with no road required. The need for roadway access through a corridor will depend on future development along the corridor and the type and scale of proposed development. The parklike quality of the corridor must be developed carefully to provide a high amenity connection to the beach and an attractive entrance for new hotel developments. Figures 14 and 15 on the following page illustrate typical cross section of two types of inland connector.

Circulation and Access: All vehicular access to hotel development sites will be from the inland connectors. No direct access to L.G. Smith Boulevard should be allowed from individual hotels.

Pedestrian access to beaches and hotels will also be via inland connectors, defining major pedestrian crossing points of L.G. Smith Boulevard. Inland connectors should be designed to provide high amenities for pedestrian and bicycle use. In addition, public right-of-way should be maintained for north-south pedestrian and bikeway access connecting to the commercial area in the south and Botanical/Wildlife Park in the north. (See Figure 13).



INLAND CONNECTOR: BOULEVARD (SECTION)
FIGURE 14



EAGLE BEACH INLAND CONNECTOR: SINGLE ROAD (SECTION)
FIGURE 15

'Oasis' nodes: In conformance with development guidelines for the entire Tourism Corridor, overall development at Eagle Beach should focus on oasis type amenity nodes of high quality planting. These nodes are located at the end of the inland connectors at the intersection point of north-south pedestrian/bikeway corridors. These should be developed as small parks up to .5 hectares in size to provide future amenities for landlocked development parcels.

"Eagle Beach Village" Commercial Development: Tourist related commercial development in the Eagle Beach area is restricted to the area adjacent to the future hospital expansion zone. An area of approximately 6 hectares plus an existing area of .8 hectares has been illustrated in Figure 13 for these tourist convenience retail uses. Parcel sizes within the commercial area may vary ranging from 2000 m² similar to existing commercial developments to larger sites as market demand dictates. To assure compatibility with low scale hotel development of the Eagle Beach area, commercial development should correspond to the 15.2 meter (50 feet) height guidelines of the 1981 Physical Development Plan. In addition, the following density guidelines should apply to commercial development at Eagle Beach:

Commercial Site Area:	$\pm 70,000\text{m}^2$	(7 Ha)
Maximum FAR: ¹	.17 (gross)	
Maximum Allowable Development =	11,900m ²	(130,000 sf)

Notes:

1. Gross FAR (Floor Area Ratio) is the ratio of commercial building area to total site area (including roads and parking). It is an indicator of building density on a given site. The FAR of .17 used above approximates the existing village-like scale of Eagle Beach today (excluding the new hospital). This village-like scale is the objective for future development in Eagle Beach and commercial development should correspond to these building densities.

Hospital Expansion: Hospital-related office/commercial development may require somewhat larger facilities and larger typical floor areas. Experience with similar office and laboratory developments in the United States and Europe indicates typical floors of 900m² - 2300m² (10,000-25,000 square feet) are not uncommon and most building efficiencies are achieved in this range. Building density FAR up to .4 is typical of this type of development. Recent new building developments near the hospital appear to be developed at approximately .3 FAR so densities up to .4 FAR would be compatible with market demand in Aruba.

Since the hospital-related expansion area is located away from the main tourism area of Eagle Beach with direct access to the proposed new Inland Connector, it is not unreasonable to allow these higher building densities to continue in that area. However, the following guidelines should be followed.

- Commercial uses must be carefully targetted to hospital-related commercial, office, and service uses. General retail and commercial uses should not be allowed. The substantial land area and higher allowable densities could result in a large commercial area that would threaten the village-like character of the Eagle Beach commercial area and compete unfavorably with the CBD in Oranjestad.
- A clear line separating the higher density office zone from the village-like tourism commercial zone should be established as shown in Figure 13.
- Building height limit of 15.2 meters (50 feet) for all areas should be maintained.

Figure 13 illustrates a hospital-related commercial expansion area of $\pm$ 8 hectares with additional future expansion area of $\pm$ 4 hectares. At building density guidelines outlined above, the following maximum development is possible:

Site Area	120,000m ² (12 Ha)
Maximum FAR (Gross)	.4
Maximum Allowable Development	48,000m ² (520,000 sf)

Public Parking: Beach parking for Aruba residents and tourists from outside the Eagle Beach area should be provided at various locations along L.G. Smith Boulevard at pedestrian crossing points from the inland connectors as shown in Figures 9 and 13. Development of public parking should be phased in relation to the growth of the Eagle Beach tourism area since this growth will bring increasing pressures for use of the beach. Existing small parking areas on the beach side of the coastal boulevard should be phased out as inland parking areas are constructed. In the future, parking along the beach should be prohibited entirely except in the areas shown.

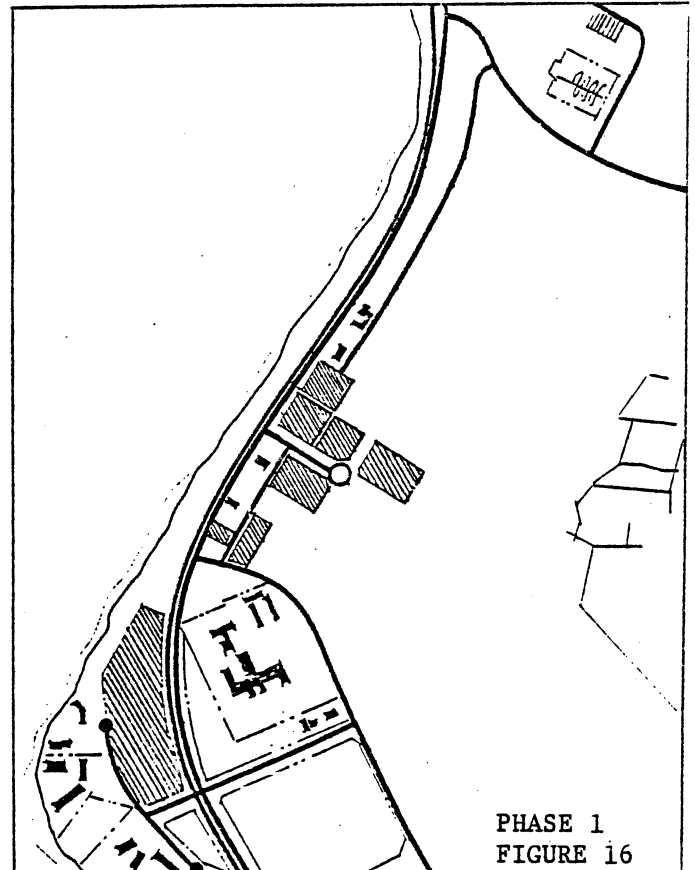
Development Phasing: The Eagle Beach District is planned to allow incremental development of roads and infrastructure as market demand dictates. It is inevitable that initial development of the Eagle Beach corridor will seek to occur first in a linear fashion along L.G. Smith Boulevard as hotels seek to maximize views to the sea. While such development pressures may be difficult to totally control, it is highly desirable that clusters of development be encouraged in the phasing plan to establish the pattern of inland development in the Eagle Beach area.

The parklike inland connectors should be constructed in phases to provide access and amenity in sequence with proposed Eagle Beach Village development activity. Initial phases of development should be focused on the complete development of the first inland connector adjacent to the proposed tourist commercial area. Following this, the next inland connector should be developed. This will allow a selection of beachfront parcels to be held for future development or until a highly desirable beach frontage development is proposed. It would be unwise to allow the entire first tier of Eagle Beach frontage to be developed in early phases, regardless of the quality of the proposal.

Following initial development of the beachfront tier of clusters, inland connectors should be extended to provide access to the second tier. Development of the Eagle Beach commercial area may follow the same sequence. While the exact phasing of parcels cannot be precisely laid out in advance, the principles of phasing should be as follows:

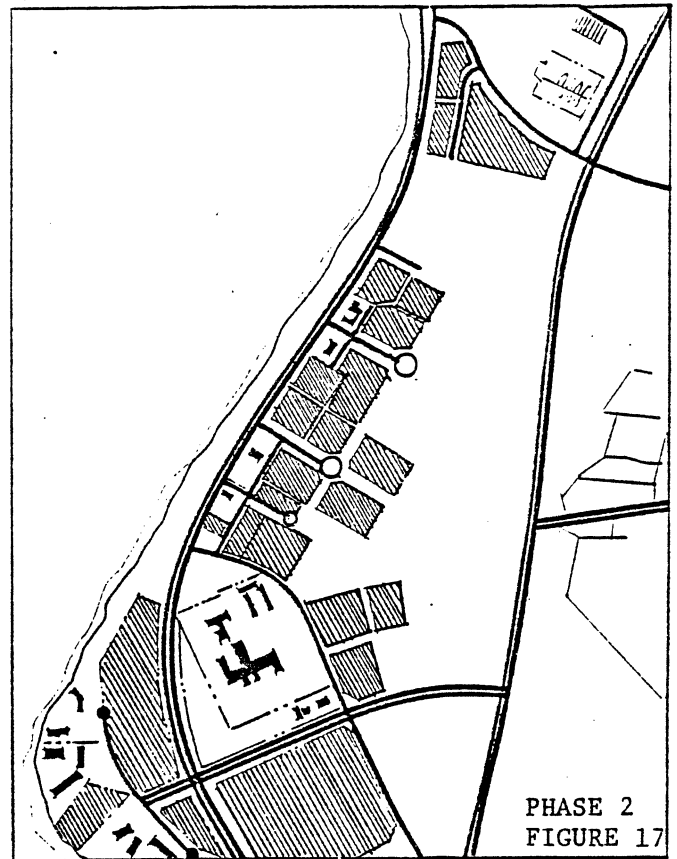
Phase One:

Development of initial hotel clusters near south end of Eagle Beach including construction of first inland connector. Continuation of cluster developments northward as tourism growth warrants. Public beach parking developed concurrently with hotel development. Continue commercial infill at corner of L.G. Smith Boulevard along existing service drive.



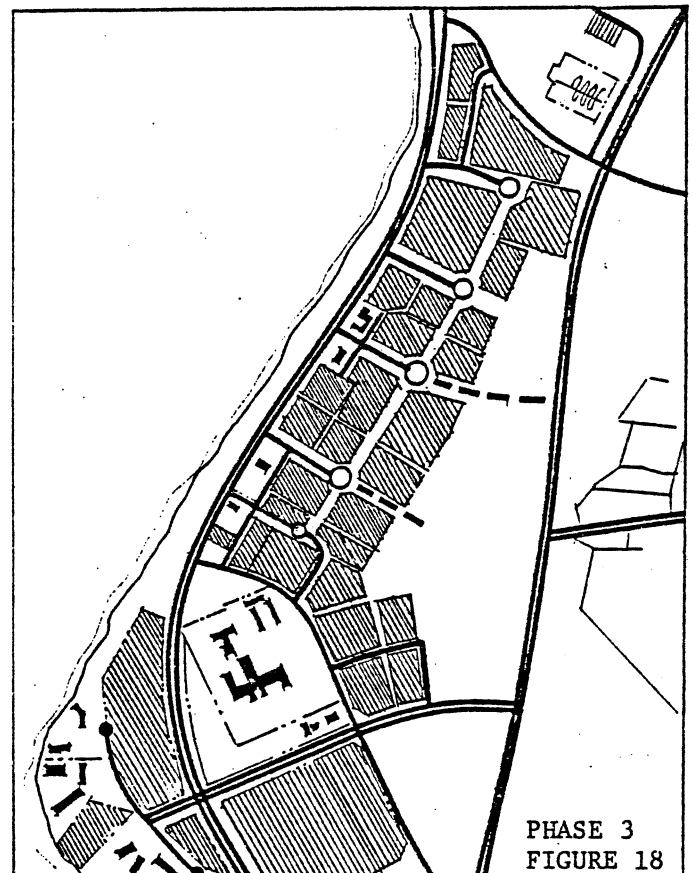
Phase Two:

First tier of small hotel cluster development nearly complete. Selected inland connectors extended to provide access to beach and amenities for inland development parcels. Selected major beachfront development parcels held for future development or future high quality development. Development of commercial loop in response to growing market demand for commercial development. Development of Inland Arterial complete.



Phase Three:

Second tier of development complete. At this point, 20 year high demand projections for the entire Tourism Corridor have been reached (year 2000). Future demand may be accommodated by extension of inland connectors and full development of oasis parks. Connector road to Inland Arterial completed to accommodate growing traffic demand.



E. Vehicular and Pedestrian Circulation

Section II-C discusses the general traffic and circulation issues of significance in the Tourism Corridor and recommends three alternative strategies to accommodate the high volume of future development anticipated in the area: Coastal Arterial, Inland Arterial and Dual Arteries (See Figures 4, 5, and 6). The Dual Arteries traffic system is recommended and serves as the basis for the Recommended Land Use Plan shown in Figures 7, 8, and 9 following page 23. This roadway development scheme meets the following objectives.

- Future traffic demand to Palm Beach from Oranjestad and San Nicolaas is accommodated by the most direct and efficient route, bypassing the increasing traffic congestion of the coastal boulevard. This is particularly important for service and emergency traffic to the northern areas of the Tourism Corridor.
- The beautiful Coastal Boulevard is preserved as a scenic route for tourists and those who choose to use it.
- Traffic volumes along the Coastal Boulevard are reduced, thereby making it easier for pedestrians to cross from inland parcels. Pedestrian priority traffic controls may be implemented which will slow down coastal boulevard vehicles.
- An efficient land use pattern is created which allows the creation of new beachfront development parcels, and connections to Horacio Oduber Hospital, the Free Trade Zone, and other non-beach uses.
- An effective boundary is created between the commercial tourist areas along the beach and adjacent residential areas.

In implementing the Dual Arterial circulation network, there are several detailed considerations regarding alignment and intersection location, pedestrian movement, hotel access, and parking location and availability which should be noted. The resolution of these issues has been illustrated conceptually on the "Recommended Land Use" plans of this report (Figures 7, 8, and 9). This section discusses certain detail considerations more fully.

There are four important levels of vehicular and pedestrian facilities which must be considered to effectively implement the Dual Arterial System and achieve the planning goals for the Tourism Corridor: (1) arterial roadways, (2) collector streets, (3) local streets or scenic drives, and (4) pedestrian paths and bikeways.

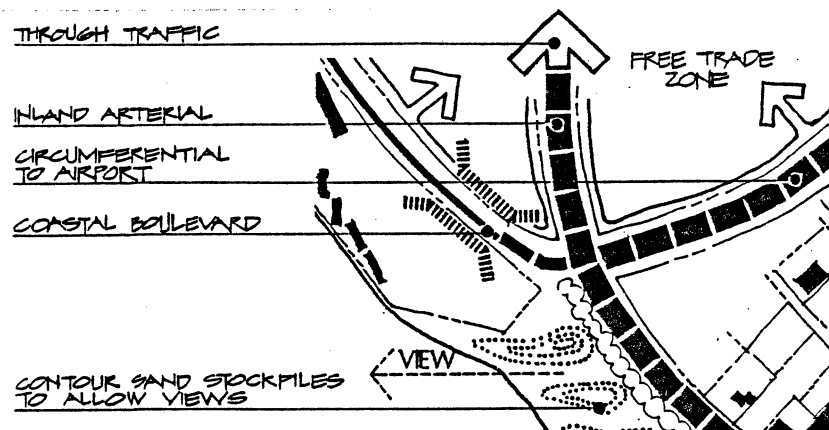
1. Arterial Roadways

Three new arterial roads are proposed for the Tourism Corridor. These include the Circumferentials to San Nicolaas and the Princess Beatrix Airport and the new Inland Arterial. Planning for the alignment of the two circumferentials has been underway for a few years by the Department of Works. Under current plans, these roads would be connected through to the Coastal Boulevard. In order to reduce future traffic volumes on the Coastal Boulevard, however, it is recommended that these circumferentials be terminated at the Inland Arterial.

The alignment of the new Inland Arterial shown on the plans will require careful detailed planning with right-of-way up to ± 40 meters wide to allow for turn lanes, landscape treatment, etc. Initially, a four lane roadway may not be required, but allowable land for future expansion should be held undeveloped. Actual pavement widths, right-of-way, etc. should be scaled to the pace and density of development in the Tourism Corridor, and detailed traffic counts and origin-destination traffic studies.

The new Inland Arterial will begin adjacent to the Hotel School at Oranjestad, where L.G. Smith Boulevard will curve inland to form the new arterial. The Coastal Boulevard at this point should be realigned to intersect the Inland Arterial, requiring a left turn to enter the coastal road when travelling north. This will encourage through traffic to use the Inland Arterial.

In addition, the circumferential to the airport, serving the Free Trade Zone expansion area could intersect the Inland Arterial at this point. Commercial traffic from the Free Trade Zone to all areas of the Tourism Corridor will thus be easily served as well as traffic from the Coastal Boulevard wishing to go directly to the airport. This is illustrated in Figure 19.



GATEWAY TO THE TOURISM CORRIDOR (PLAN)

FIGURE 19

At the northern end of the Tourism Corridor, the Inland Arterial will rejoin L.G. Smith Boulevard north of Palm Beach following the alignment currently under consideration by the Department of Works (DOW). Access to Palm Beach hotels will be provided via the Palm Beach/Noord Road. Special boulevard - like treatment between the Inland Connector and the Coastal Boulevard should be developed along this important collector street. This will be discussed more fully below.

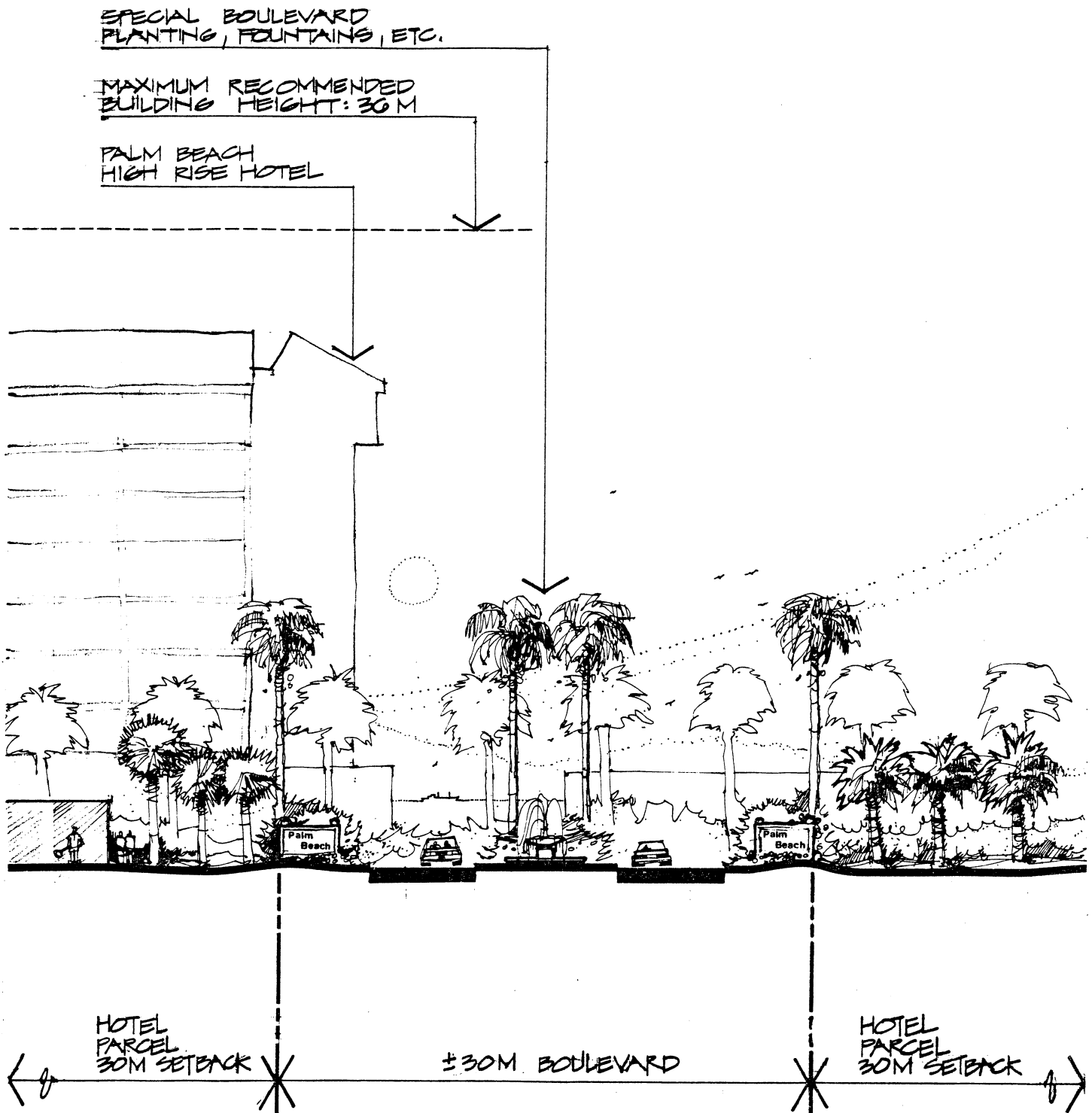
To discourage through traffic to Palm Beach from using the Coastal Boulevard, the boulevard will be discontinued between the Wildlife Park and Palm Beach and realigned to intersect with the Inland Arterial at the Old Molen.

It is conceivable that the destination of a significant volume of traffic from the Palm Beach area will be the airport or areas outside the center of Oranjestad. However, the efficient alignment of the Inland Arterial may encourage traffic to go through Oranjestad rather than turn onto one of the circumferential roads. This could severely impact the already congested L.G. Smith Boulevard in the center of the city. To minimize this problem, traffic around Oranjestad from the Tourism Corridor should be encouraged to use one of the circumferential roads. Intersection design to encourage these traffic movements must be incorporated into the design of the Inland Arterial at the Palm Beach/Noord Road, Bubali Road, Circumferential to San Nicolaas, and Circumferential to the airport.

2. Collector Streets and Gateway Connections to the Tourism Corridor

Collector streets, both existing and proposed are indicated in various areas throughout the Tourism Corridor. In the southern portion, these streets will be necessary primarily to provide connections between the Coastal Boulevard and the new Inland Arterial. The most important of these collector streets provide gateway entrances to the various districts of the Tourism Corridor. These important gateways to the beach include (see Figures 7, 8, and 9):

- a) New connection between the Inland Arterial and the Coastal Boulevard at Palm Beach adjacent to parcels 4 & 5. This connection provides access to new development parcels and private lands in the area.
- b) The Noord Road between the Inland Arterial and the Coastal Boulevard at Palm Beach. This is the most important entrance to the Palm Beach district. As the primary entrance to Palm Beach, this connection should be upgraded to a grand boulevard proclaiming the visitor's arrival at Palm Beach. Figure 20 illustrates the possible character of the Palm Beach Gateway.



GATEWAY TO PALM BEACH (SECTION)
FIGURE 20

- c) New connection between the Inland Arterial and Coastal Boulevard at Olde Molen. With the Wildlife Park on the south of this road, the area around Olde Molen should be improved with agricultural plots, grasses, or other planting to provide a setting for the mill and a beautiful entrance to the beaches at this point.
- d) Bubali Road between the Inland Connector and the Coastal Boulevard. Bubali Road will be an important access point for local residents travelling to Eagle Beach. Public parking has been illustrated on both sides of the Bubali Road where it intersects with the Coastal Boulevard.
- e) The hospital access road connecting the Inland Arterial with Manchebo Beach. Like the gateway to Palm Beach, this road will serve as an important gateway to the hotel "Villages" of Manchebo Beach and Eagle Beach. It will also provide direct access to the hospital and related commercial areas from outside the Tourism Corridor. It, too, should be designed as a high amenity entrance boulevard.
- f) The Gateway to the Tourism Corridor at Druif Beach. This is the most important gateway connection of all between the Inland Arterial and the Coastal Boulevard. It is the area that the views of the beach, the sea, and the tourist villages are first perceived. Special treatment of ornamental plantings, fountains, special lighting, etc. should be designed for this area.

In addition to the important gateway connections to the Tourism areas, in the areas north of Palm Beach, new collector streets are illustrated to provide access to the beach from the inland residential areas. These streets should be smaller scale than the boulevard collectors in the southern areas of the Tourism Corridor, in harmony with the scale and character of the residential neighborhoods. Provisions should be made for pedestrian circulation and 'oasis' nodes along these routes to the beach.

3. Local Streets and Scenic Drives

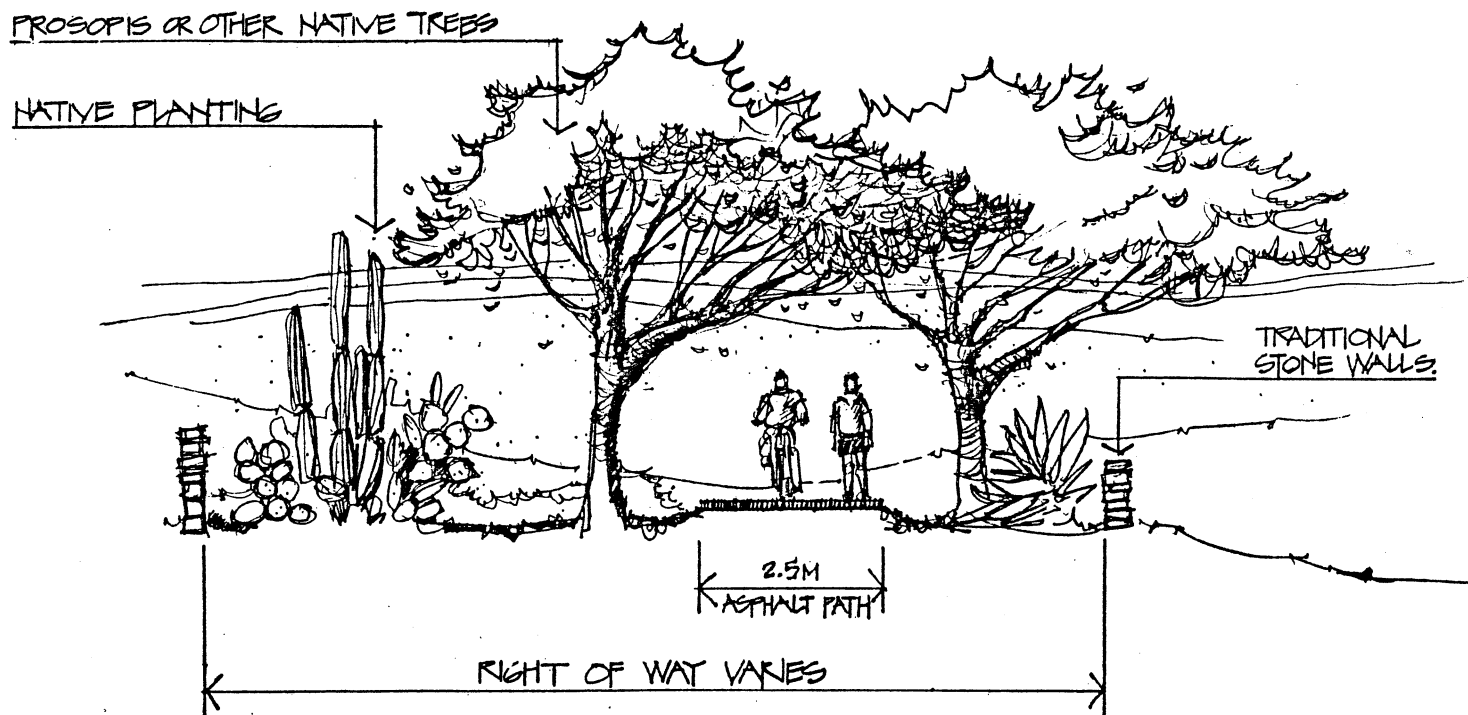
The most important streets of this type are found in the California Point area. To be compatible with the unique quality of the area, these streets should be small scale roads of + 6 meters width. Barriers such as bollards of native stone or other indigenous material should be incorporated into the edge design of these roads to discourage off road vehicular travel. These roads may be unpaved but should be constructed of generally permanent, all-weather material to reduce maintenance and avoid negative vehicular impacts on unimproved road areas.

4. Pedestrian Paths and Bikeways

Two of the most important objectives of the 1981 Physical Development Plan were to "provide alternative (non-automotive) types of circulation within the Tourism Corridor" and "provide for public access to beach and water areas...". These two objectives are of critical importance in the future development of the Tourism Corridor, particularly as inland parcels are developed resulting in greater distances for pedestrians to reach the beaches. In addition, as amenities such as the Wildlife Park are developed, there will be greater reason for north-south movement of pedestrians from the Eagle Beach and Palm Beach areas.

To meet these objectives, the Tourism Development Plan illustrates a network of pedestrian and bikeway connections to the beach and throughout the Tourism Corridor. In the north, at California Point, a network of footpaths are proposed that provide a loop around California Point and connections to possible future trails along the entire North Shore. These footpaths would be unpaved trails scaled to the natural qualities of the area.

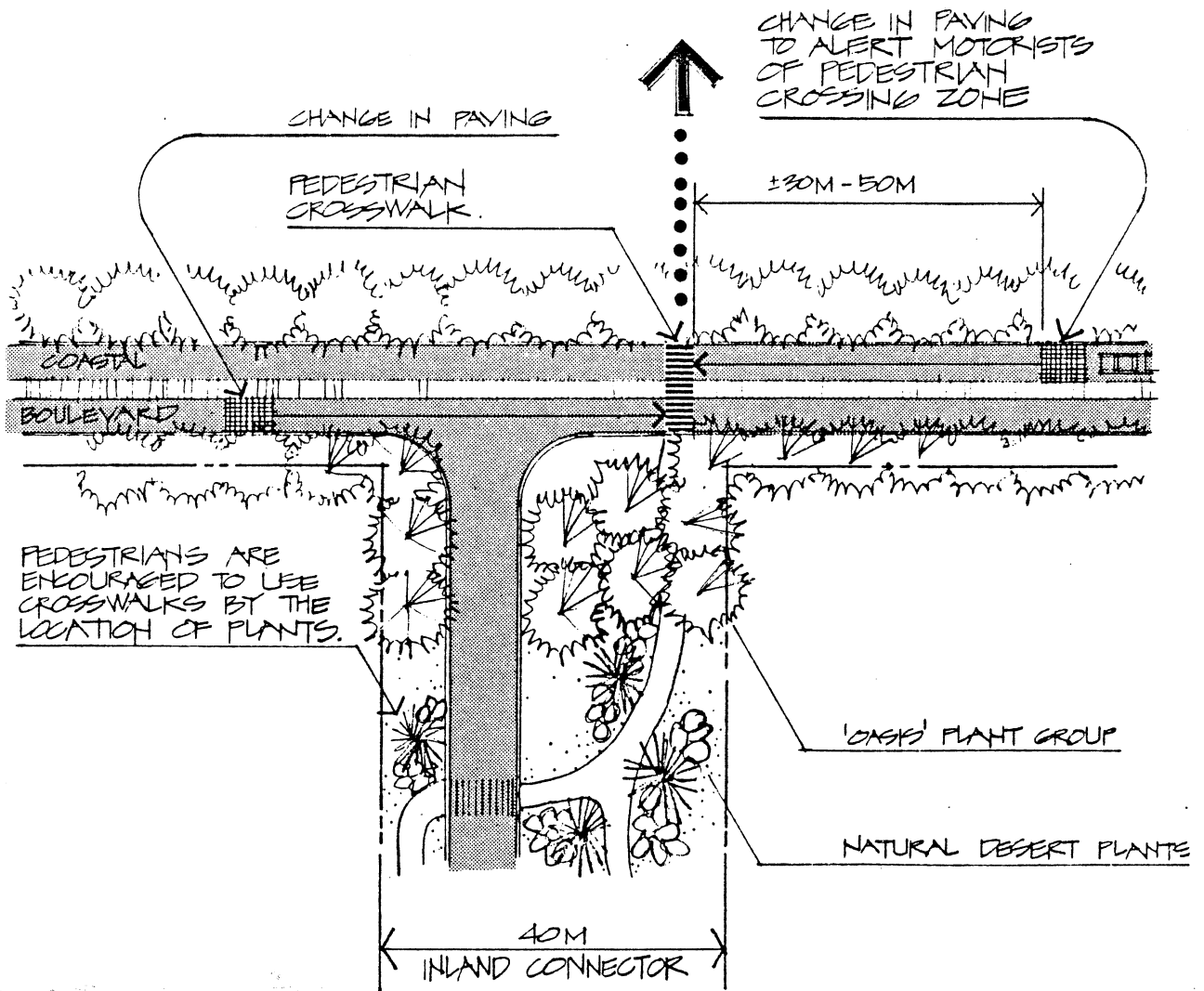
South of the Malmok area, pedestrian connections to the beach and north-south pedestrian circulation corridors are shown throughout the Tourism Corridor. In the residential areas between Palm Beach and Malmok these pedestrian routes may be unpaved. In the more intensely developed areas to the south, these pedestrian routes should be asphalt paved up to 3 meters wide similar to the existing path between the Tamarijn and Divi Divi Beach Hotels. If demand for bicycle ridership grows, then most of these paths should be paved. As illustrated in figures 7, 8, and 9 (following page 23), it is conceivable that a continuous link from Eagle Beach to California Point for bicycles or walking is possible along the inland pedestrian routes at Eagle Beach and Wildlife Park, along the downgraded Coastal Boulevard at Palm Beach and following neighborhood roads and footpaths north of Palm Beach. Figure 21 illustrates the possible character of pedestrian paths through native desert areas between oasis points.



PEDESTRIAN PATH AND BIKEWAY (SECTION)

FIGURE 21

An additional important consideration for pedestrian circulation planning is the crossing points of major roads and boulevards throughout the Tourism Corridor. The Recommended Land Use Plan (Figures 7, 8, and 9 following page 23), illustrates most major pedestrian crossing points of the Inland Arterial and Coastal Boulevard at intersections with collector or local streets. These intersections should be designed to assure pedestrian safety. In areas such as Eagle Beach, measures to assist pedestrians crossing the Coastal Boulevard from the 40 meter wide inland connectors should be implemented. Since most of the high speed through traffic will now bypass the Eagle Beach area, pedestrian priority signalization may be installed. Another useful method may be the installation of special pavings in the boulevard to warn drivers of coming pedestrian zones. The use of these special pavings has been attractively and effectively used in many waterfront boulevards of the world. Figure 22 illustrates the use of such special paving at a typical inland connector crossing the Coastal Boulevard at Eagle Beach. This diagram is illustrative only and is not intended to indicate actual intersection design which will require more detailed analysis of traffic volumes, turning movements, etc.



INLAND CONNECTOR PEDESTRIAN CROSSING AT EAGLE BEACH (PLAN)

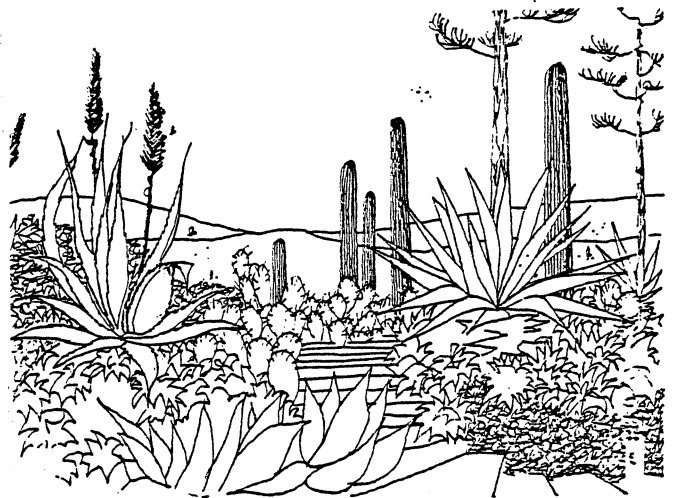
FIGURE 22

F. Planting and Revegetation Concepts

Section II-C outlined the major issues and objectives which the government of Aruba should address in planting and revegetation in the Tourism Corridor. In light of the difficult soil conditions and lack of water, the primary objective should be to use planting strategically and effectively to achieve the highest quality with the lowest investment of scarce resources. Several measures to accomplish this objective were discussed in previous sections. The following section discusses these measures in greater detail.

1. Use of Native Plantings

Perhaps the most important underlying principle is that the island of Aruba should attempt to capitalize on the beauty and potential of the existing desert landscape rather than change the image of the island to that of a lush, green Caribbean island. The sheer size of the Tourism Corridor makes it impractical to think in terms of "greening" the entire area. Therefore, landscape improvements should be based on planting concepts that utilize native plants as much as possible. These plants require little water; many are salt tolerant, and once established, they require little maintenance. More important, however, is the unique beauty of the desert landscape and the plants that have adapted to it. Many plants native to desert environments like Aruba have dramatic foliage effects, flowers, sweet aromas, and interesting growth habits. A carefully designed landscape utilizing these plantings is a memorable experience. Indeed, thousands of tourists are attracted annually to high quality desert resorts of the Southwestern United States because of the unique visual qualities of the desert landscape. It is to desert resorts such as these that island planners should be looking for comparable landscape character rather than to the resorts of Florida and the northern Caribbean.



Native planting should be used primarily to create the desert background for the more focused, intensively planted green areas of hotels, parks, etc. The landscape character of these desert areas which will comprise most of the land area of the Tourism Corridor, must be as carefully considered as the intensively landscaped areas, and certain indigenous species encouraged for their foliage, shade, growth habit, etc. Following is a partial list of selected desert species which might be used extensively in the Tourism Corridor (see following page):



Native trees such as these in the Washington area provide shade and an attractive background, while requiring little water or maintenance.

Native or Introduced Desert Plants for Use in the Tourism Corridor

Botanical Name	Common/Local Name
● Succulents, Groundcover and Cacti	
Agave	Century Plant
Aloe	Aloe
Cereus spp.	Cactus
Ipomoea pes-caprae	Goats Foot
Mesembryanthemum	Ice Plant
Opuntia	Cactus
Sansevieria trifasciata	Whipcord Hemp
● Shrubs	
Atriplex polycarpa	Saltbush
Cassia spp.	Senna
Hesperaloe parvifolia	Red Yucca
Yucca brevifolia	Joshua Tree
Y. elata	Soap Tree
● Trees	
Acacia spp.	Acacia or Wattle
Casuarina equisetifolia	Horsetail Tree
Eucalyptus camaldulensis	Red Gum
Parkinsonia aculeata	Mexican Palo Verde
Plumeria acutifolia	Fragipani
Prosopis juliflora	Mesquite
Tamarix aphylla	Tamarisk
Terminalia catappa	Indian Almond
Ziziphus jujuba	Chinese Date

2. Existing Vegetation

In addition to new plantings of native desert species, efforts should be undertaken to preserve existing vegetation in areas where it is fully mature. The government should take particularly strong action to preserve the native Watapana trees, whose contorted forms have a sculptural quality which is a trademark of Aruba. Island planners should consider making development approvals contingent upon the preservation of these trees where they exist.

Within the Tourism Corridor there are areas of thriving native vegetation which should receive special consideration in future development plans:

- Arashi Valley: Significant stands of *Opuntia* and *Cereus* cactus species dominate the landscape of the Valley. Development should be severely restricted in the valley as outlined in Section III-A. The native vegetation of the valley should be encouraged and additional desert species, particularly cactus and succulents, carefully added to increase the dramatic character of the valley landscape.
- Malmok/Arashi Ridge: On the southern slope of the Malmok/Arashi ridge are several areas of native cactus species worthy of protection. One large hilltop is particularly noteworthy both for the density of existing vegetation and as a natural backdrop for surrounding development. This area has been specifically identified in Figures 4 and 7. Like other native areas in the Tourism Corridor, this hilltop should be preserved in its native condition. Measures should also be taken to assure that vandalism, trash dumping, vehicular movements and other impacts of nearby development do not occur in this area.
- Palm Beach/Malmok: Inland of the Coastal road between Palm Beach and Malmok is an extensive area of mature Agave, Aloe, Sea Grape, and Watapana trees. Development of this area should be sensitively located to preserve as much of this native vegetation as possible, particularly outstanding specimens which can become the visual focus of gardens or pedestrian areas.

3. 'Oasis' Nodes

Not all of the Tourism Corridor landscape should be designed as a desert, of course. Certain areas of high activity, such as hotel courtyards and important public areas should be planted with exotic varieties which do well in Aruba and can create special effects. However, their use should be focused into areas of limited extent, like a desert oasis, to optimize the use of precious water resources and target expensive infrastructure. Indeed, as part of the desert landscape, the lush green oasis adds dramatic contrast to the native background of the desert. The finest desert resorts capitalize on these qualities.

To a large extent, the courtyards and grounds of the existing hotels (and many residences) of Aruba already achieve these effects. However, as more and more hotels are built and desert areas infilled, there is often a tendency to try to create a continuous lush green landscape of high water-demanding plantings. It is noteworthy that much of the Palm Beach area has been extensively planted over large areas in this manner. As an 'oasis' in the Aruban desert, the arrival at Palm Beach is heightened by the change of landscape character which this creates. The effect would be lessened by extending such planting the entire length of the Tourism Corridor, however, not to mention the incredible cost of water resources involved.

Several areas have been identified conceptually in this report as suitable for oasis type park development in the Tourism Corridor. (See figures 7, 8, 9, and 13). These range from the major wildlife/botanical park near Palm Beach to isolated picnic and camping nodes in the Malmok/Arashi area. A wide range of suitable plantings may be used in these areas, depending upon desired effect, water cost and availability, irrigation, and design of each oasis park.

4. Agricultural Development in the Tourism Corridor

The development of certain agricultural land uses can be of interest in the tourism area and provide good buffers between the tourist areas and other land uses. Strategically located as part of the overall oasis node concept for landscape improvement, agriculture can provide both aesthetic benefits and economic return on the investment of scarce water and soil resources. The Recommended Land Use Plan (Figures 7, 8, and 9) illustrates several areas of possible agricultural development in various parts of the Tourism Corridor. These agricultural areas are illustrative only. Actual locations will depend on specific suitability of each site for agricultural development. Following are the major criteria for locations of agricultural parcels shown on the plan:

- Soils with potential for agriculture as identified in the "Water Resources Development Plan (1975) prepared by Finkel and Finkel. Although certain areas fall outside the generalized areas shown by Finkel, it is reasonable to assume that high quality soils may be found adjacent. Site specific soil investigations will determine actual location of soils suitable for agriculture.
- Views from Tourism Corridor - Agricultural areas are located at intervals to provide maximum visual impact upon views across the salinas from the tourism areas, thus providing an interesting background edge of mixed residential and agricultural uses.

- Water availability - Many agricultural areas are located adjacent to drainage courses from upper elevation areas. This will allow easier irrigation by gravity fed piped water from existing upland dams.

In order to be compatible with the objectives of the Tourism Corridor, only certain types of agriculture should be promoted in the area. Generally, agriculture should be limited to land-based irrigated row crops, flowers, or orchards. Animal husbandry operations, which are primarily devoted to goat, sheep, and pig breeding in Aruba, are incompatible with Tourism objectives, primarily because of odors and unsightly areas associated with these operations. In addition, wandering herds of goats can cause damage to the improved landscape of the tourist areas and be a nuisance to tourists.

Recently, substantial efforts have been taken to promote hydroponic agriculture in Aruba. These operations also should not be encouraged within the Tourism Corridor. Hydroponic agriculture generally requires large greenhouses and mechanical systems which contribute little, visually, to the quality of the landscape. All vegetation is usually enclosed and out of view. This is not to say that hydroponic agriculture should be discouraged in Aruba. Only that it should be located in other, more suitable, areas of the island.

Orchard trees, particularly fruiting varieties, will have the most positive impact on the landscape of the Tourism Corridor due to their large size and fragrance of their blossoms. Coconut and date palm plantations are also quite attractive, as the existing groves in Andicouri and Daimari indicate. Orchards may be organized in clumps or groups to enhance the 'oasis node' character of the entire tourist area, or they may be arranged in linear fashion along terraced hillsides or isolated soils areas. The configuration will depend on a site-by-site determination of soils, water, slope, and views.

Row crops and flower cultivation should also be encouraged in the Tourism Corridor, particularly those with showy foliage or flower effects. Cultivated crop areas may be screened from northeasterly winds with local stone walls or native plant materials to create an interesting pattern of color and texture in the transition zone between the Tourism Corridor and adjacent residential areas. Flowers may be selected to be sold for use in tourist hotel rooms. Other crops, including vegetables, grains, and spices may also find an important market among the tourism hotels.

Following is a partial list of agricultural commodities which should be considered for use in the Tourism Corridor. Most of the following are currently under cultivation at the Aruba Agricultural Experiment Station at Santa Rosa.

Botanical Name	Common Name	Local Name
● Orchards		
Anacardium occidentale	Cashew	Cashu
Annona muricata	Soursop	Sorsaka
Carica papaya	Papaya	Papaya
Citrus spp.		
Cocos nucifera	Coconut Palm	Coco
Mangifera indica	Mango	
Olea europaea	Olive	
Phoenix spp.	Date Palm	
Psidium guajava	Guava	Guyaba
Tamarindus indica	Tamarind	Tamarijn
● Vegetables and Spices		
Allium fistulosum	Onion	Siboyin
Arachis hypogaea	Peanut	Pinda
Capsicum spp.	Red Pepper	Promenton
Cucumis sativas	Cucumber	Komkommer
Hibiscus esculentus	Okra	Jambo
Lactuca sativa	Lettuce	Lechuga
Lagenaria siceraria	Gourd	Calabas
Phaseolus spp.	Bean	Boonchi
Solanum melongena	Eggplant	Berenhein

IV. FUTURE ACTION

IV. FUTURE ACTION

A. Next Steps

In Summary, the following section describes immediate actions which island planners should undertake in future efforts to guide development of the Tourism Corridor.

Corridor-wide actions

- Alignment and right-of-way requirements for a new Inland Arterial roadway should be determined by the Department of Works (DOW). A moratorium on all development applications within the roadway corridor should be established until feasibility and right-of-way of new roadway are determined.
- Detailed soils analysis of all areas with potential for agriculture should be conducted immediately under the auspices of the Department of Agriculture. Island planners should consider the suitability of soils for agriculture in the approval of development leases in the areas adjacent to the Tourism Corridor.
- Design review procedures for implementing planting concepts and development controls should be initiated. Specific design guidelines which conform to the intent of the Recommended Land Use Plan should be developed and made conditional for lease approval.
- Salinas stabilization experiments should be initiated immediately. Detailed soils analysis and experiments with salt tolerant plantings should begin for use in future salinas improvement plans in the Tourism Corridor and around the island.

Arashi/Malmok

- Further development of private residential or commercial facilities in the Arashi Valley should be halted. A moratorium on further leases should be established until plans for the North Shore have been developed.
- Measures to restrict vehicular access in the Arashi Valley to certain designated travel ways should be initiated.
- A ridgeline development setback should be immediately established between Malmok and the Arashi Valley. A moratorium on further development leases above the Malmok Road should be established until development height limit and ridgeline setbacks are clearly established.

Palm Beach

- Detailed platting of new roads, pedestrian beach access and development parcels created by relocation of the coastal boulevard should be prepared. This will be useful both in evaluating feasibility of roadway relocation and guiding future development at Palm Beach.

Sewage Treatment Plant/Wildlife Park

- Detailed site investigations should be conducted to determine the feasibility of the site for development of a wildlife park/botanical garden, including:
 - soils sampling and analysis
 - water quality analysis
- User analysis and park programming should be initiated to determine type and extent of facilities required, expected revenues, etc.
- Development cost estimates to determine feasibility of park and expected phasing.
- Following initial feasibility and programming, detailed design for Phase 1 development of the park should be initiated.

Eagle Beach and Druif Beach

- Detailed platting of new roads, inland connectors, hotel development parcels and commercial facilities should be prepared. Detailed design documents for implementation of Phase 1 inland connector should be prepared.
- Beach sand nourishment and storage area adjacent to the new Hotel School should be contoured and shaped to allow views from the coastal boulevard to the sea. This area is the gateway to the Tourism Corridor and efforts should be made to allow first views to the sea from this area.

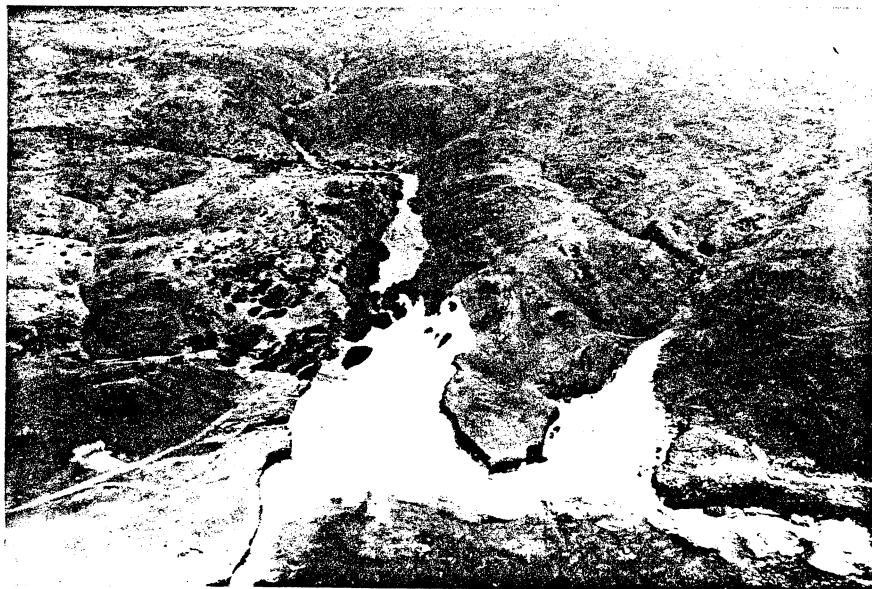
B. Tourism Development Outside the Tourism Corridor

In addition to immediate actions in the development of the Tourism Corridor island planners should begin to consider in greater detail the planning and careful development of several other important tourism-related areas of the island. Although the beaches of the Tourism Corridor are the primary focus of tourist activity in Aruba, the island government should protect and promote all of its resources for tourism development. This will provide a high quality environment for both tourist visitors and permanent residents of the island. The following pages briefly discuss two important tourism-related areas of the island for which planning should begin.

North Shore National Park

The 1981 Physical Development Plan identified the rugged northern Coast of Aruba from California Point in the north to Boca Grandi in the south as "perhaps the second most important tourism related natural resource" in Aruba.

"This rugged coastline is indented by deep ravines that create protected sandy coves and palm groves at a number of locations such as Andicouri and Diamari. The Natural Bridge, located midway along the North Coast, is a dramatic example of an attraction for tourists who are interested in visiting areas on the island some distance from their hotels and which differ in character from the beach environment along the West Coast".



Indeed, informal discussions with tourist visitors to the island indicate that a large percentage have enjoyed visiting the North Shore area. As tourism development increases in Aruba, the impact of increased visitors to the North Shore will become more and more apparent. Soon private development proposals seeking to capitalize on the tourism and residential potential of the North Shore will begin pouring in. The area is extremely sensitive to indiscriminate development. Without careful planning controls, the dramatic and unique qualities of the area could be negatively impacted. The 1981 Physical Development Plan addressed the vulnerability of the area to development:

"A critical characteristic of the Northern Coast is its vulnerability to development. The visual quality of this landscape is extremely sensitive and even random building development of private residences could serve to destroy what is a very unique and somewhat primitive landscape quality... Aruba's desert climate and landscape is at its best in this zone and every effort should be made to preserve its integrity."

To accomplish this objective, the plan endorsed the full implementation of a program to create a North Shore National Park. An important aspect of such a program would be to provide improved vehicular access and better signage to the area to make it an integral part of the island tourism experience. However, along with improved access, plans must be implemented to control indiscriminate off-road vehicles and control development of sensitive areas.

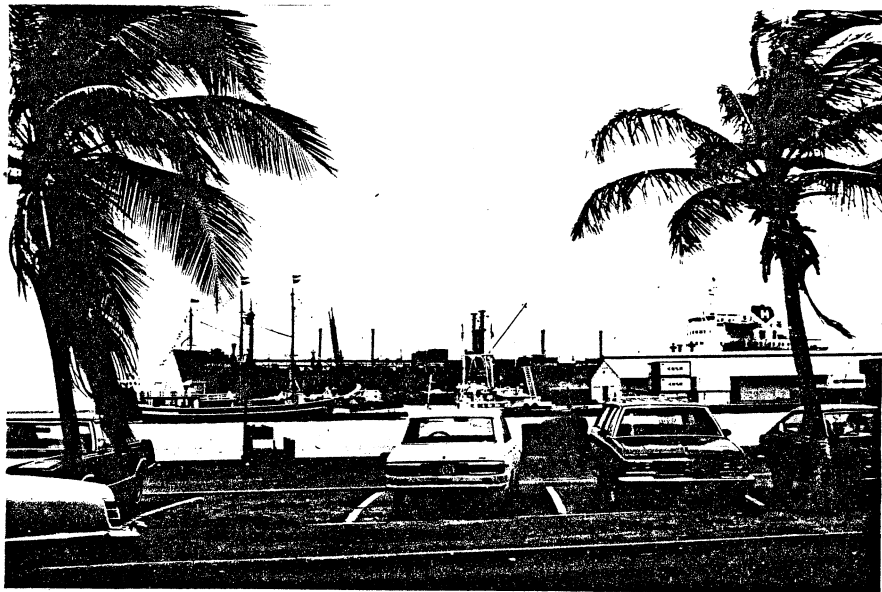
As the first steps toward implementing a North Shore National Park program, the Island government should take the following actions:

- Detailed inventory and analysis of important natural and cultural features of the North Shore area.
- Identify important tourist and resident recreation areas, critical environmental areas, and other areas suitable for protection in the National Park.
- Prepare general master plan for future development of North Shore National Park including roads and circulation, building development guidelines, private development areas, public recreation facilities, etc.

Oranjestad Waterfront

The Oranjestad waterfront has significant potential for being a more important tourism center in Aruba. Leaving the airport and travelling along L.G. Smith Boulevard, the harbor at Oranjestad is the gateway to the Tourism Corridor. For visitors arriving by boat, the harbor is both their entry point and their destination. For all visitors to Aruba it is the place where the first, and possibly most important, impressions of Aruba are formed. The impressions of this urban area can make the difference between whether a visitor chooses to return to Aruba or visit other Caribbean destinations with attractive urban waterfronts such as Curacao or St. Martin.

At present, the development of the harbor area for public activities appears to have received little attention. Most of the area is dominated by parking lots and vehicular traffic along L.G. Smith Boulevard. Commercial development does little to capitalize on the unique qualities of the harbor location.



Despite these problems, the Oranjestad harbor remains as one of the most dramatic features of the town. The scale of the harbor is intimate and picturesque and the docking of large ships and sailing boats across the water provide a dramatic backdrop and a sense of protected enclosure for the harbor. Compared with the harbors of small cities in other parts of the world, the harbor at Oranjestad is ideal for development in an intensive manner for both public activities and private facilities.

The potential for dramatically increasing the role of tourism in the harbor area was noted in the 1981 Physical Development Plan, "by providing improved facilities for cruise ships, expanding marina facilities for private pleasure craft, and developing public promenades and spaces along the water's edge." In addition commercial activities which capitalize on the harbor should be developed. Shops, restaurants, hotels, and residential areas will all contribute to a lively waterfront environment. The potential for carefully planned waterfront development to be a positive contribution to the downtown is well documented throughout the world.

To achieve these objectives, island planners should set out to develop a comprehensive development plan for Oranjestad Waterfront. Land uses, density, building development guidelines, circulation, and public facilities should be planned which will provide a memorable experience for the visitor to Aruba and an exciting place for local residents to gather.

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